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**WASTE DISCHARGE REQUIREMENTS ORDER NO.
NPDES NO. CA0079316
PLACER COUNTY DEPARTMENT OF FACILITY SERVICES
PLACER COUNTY SEWER MAINTENANCE DISTRICT NO. 1
WASTEWATER TREATMENT PLANT
PLACER COUNTY**

This permit, NPDES No. CA0079316, regulates the treatment of up to 2.18 million gallons per day of wastewater (design dry weather flow) from Placer County Department of Facility Services, Sewer Maintenance District No. 1 Wastewater Treatment Plant (SMD1 or WWTP), and the discharge of the treated wastewater to Rock Creek and downstream waters. The existing Waste Discharge Requirements Order No. 97-113 was adopted on 20 June 1997 and expired 1 June 2002. The existing Order was a renewal of previous Order No. 92-116. Placer County Department of Facility Services (hereafter Discharger) owns and operates a wastewater collection, treatment, and disposal system for the unincorporated area of North Auburn that serves a population of approximately 15,000 and includes much of the industrial area of Auburn. The terrain in North Auburn, including the WWTP and its service area, is mountainous. The WWTP location is shown in Attachment A, and a process flow schematic is shown in Attachment B. The WWTP is on Joeger Road, approximately ½ mile west of Highway 49 in North Auburn. The discharge is to Rock Creek and the outfall location is described as latitude 38° 57' 55" longitude 121° 06' 15".

The WWTP currently provides tertiary treatment when influent flows are 3.5 MGD or less. When flows are greater than 3.5 MGD the discharge from the WWTP is some combination of secondary and tertiary treated wastewater as described below. The plant consists of the following: Headworks: influent flow meter, comminution, and aerated grit removal; Primary Clarification: two rectangular primary clarifiers; Secondary Treatment: three Rotating Biological Contactors (RBCs), two trickling filters, and four circular clarifiers; Biological treatment for ammonia removal is provided by the RBCs and trickling filters; Intermediate and final clarification is provided by the four circular clarifiers. Gravity Filtration: six gravity filters with anthracite media; Coagulants are used prior to filtration. The capacity of the filters is 3.5 MGD (peak wet weather flow is over 8 MGD). Disinfection: three chlorine contact chambers and dechlorination is provided by sulfur dioxide gas. Sludge Treatment: primary and secondary digesters, belt press, and sludge drying beds.

Prior to recently completed plant improvements, the WWTP had several operational difficulties, including the following:

- A. During high flows, it was possible for the primary clarifier to be flooded, causing scum and grease to pass through.
- B. In the past it has been difficult for the operators to maintain nitrification in the RBCs, particularly in cooler temperatures and ammonia was frequently detected in the receiving water. In order to meet receiving water limits for ammonia in the existing Permit, the Discharger purchased water from the Placer County Water Agency to dilute ammonia levels before discharge to Rock Creek.

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- C. If all flow is allowed to pass through the gravity filters during high flows, the gravity filters may be overloaded and cause backflow into the secondary clarifiers. Therefore, it is sometimes necessary to rout high flows around the gravity filters to the chlorine basins, to avoid overloading the filters and backflow into the secondary clarifiers. There have been occasions when the gravity filters were bypassed completely.

The Discharger proposed plant improvements to the Regional Board in a report that was received 26 May 2000. In a 5 September 2000 letter to the Discharger, Regional Board staff commented that reductions in ammonia concentrations could result from the proposed improvements that would comply with the receiving water limitations in the existing permit. However, Regional Board staff noted that when the permit is renewed, the Receiving Water Limitations for ammonia must be changed to Effluent Limitations, and recommended that the Discharger consider this factor in their calculations and construction plans. In addition, Regional Board staff noted that the proposals did not appear to include denitrification and recommended that the Discharger consider future effluent limitations for nitrates.

The Discharger recently completed WWTP upgrades to resolve the operational difficulties described above, including the following:

- A. An additional combination primary clarifier/flow equalization basin was constructed. During high flows, the new primary clarifier/flow equalization basin will be used as a primary clarifier to eliminate flooding of the existing primary clarifier. When flows are low, filter backwash and pressate from the sludge filter press may be routed to the equalization basin to equalize the ammonia loading to the nitrification unit processes.
- B. Two existing but unused trickling filters were retrofitted to provide additional nitrification. (The RBCs provide removal of organic matter and partial ammonia removal.)
- C. From the primary clarifiers, flow was rerouted to the RBCs as a step-feed system, replacing the previous plug-flow system.
- D. Former final clarifiers 1 and 2 will be used as intermediate clarifiers, and clarifiers 3 and 4 will be used as final clarifiers during dry weather. Clarifiers 3 and 4 were modified to increase wall height to allow gravity flow to the trickling filters. When sustained influent flows exceed 3.5 MGD, excess flow will be routed around the trickling filters and flow directly to the final clarifiers. A secondary benefit of the retrofit of final clarifiers 3 and 4 is that the gravity filters can now be used during high flows up to 3.5 MGD. All flows greater than 3.5 MGD must also be routed around the gravity filters to the chlorine contact chambers.

The point of effluent discharge to Rock Creek is described as latitude 38° 57' 55" longitude 121° 06' 15". The discharge point on Rock Creek, is approximately 200 feet upstream of the confluence

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with Dry Creek. Approximately 1.7 miles downstream of the confluence with Rock Creek, Dry Creek merges with Orr Creek. Downstream of the point where Dry and Orr Creeks merge, the creek is called Coon Creek. On Coon Creek, approximately 0.9 miles downstream of the Dry/Orr Creek confluence, there is a diversion dam operated by Nevada Irrigation District (NID) for irrigation purposes. From this point, the flow of water, including effluent, has been traced downstream as follows:

- A. In western Placer and eastern Sutter Counties, downstream of the NID Diversion Dam, Coon Creek flows approximately 25 miles through a relatively flat area where the flow meanders and splits into several channels, including Main Canal, Bunkham Slough, Markham Ravine, and East Side Canal. Flow from these channels eventually enters Natomas Cross Canal. Flow from Natomas Cross Canal enters the Sacramento River just below the confluence with the Feather River. The total distance from the discharge point on Rock Creek to the Sacramento River is approximately 34.5 miles.
- B. The NID Diversion Dam pulls water from Coon Creek into Camp Far West Ditch or Canal. Water from Camp Far West Ditch follows several flow paths to the Bear River, which is tributary to the Feather River and the Sacramento River, as follows:
 1. The majority of the water in Camp Far West Ditch flows into Yankee Slough, which flows directly to the Bear River just upstream of the confluence with the Feather River.
 2. A small volume of water in Camp Far West Ditch flows into Camp Far West Reservoir via Renken, Forbes, and Church Canals. Camp Far West Reservoir is constructed on the Bear River.

Beneficial Uses

The Regional Board adopted the Water Quality Control Plan for the California Regional Water Quality Control Board, Central Valley Region, the Sacramento River Basin and the San Joaquin River Basin, Fourth Edition – 1998 (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin. State Board Resolution No. 88-63, a part of the Basin Plan, requires the Regional Board to assign the beneficial uses of municipal and domestic supply, to water bodies that do not have beneficial uses specifically identified in Table II-1 of the Basin Plan. Rock Creek, Dry Creek, and Coon Creek are not identified in the Basin Plan. Therefore, the municipal and domestic supply beneficial uses are applicable to Rock, Dry, and Coon Creeks.

In western Placer County and eastern Sutter County, Rock Creek, Dry Creek, and Coon Creek are tributary to Natomas Cross Canal and the Sacramento River. The discharge enters a section of the Sacramento River between the Colusa Basin Drain and I Street Bridge, the first body of water downstream of Rock Creek, via Natomas Cross Canal, for which the Basin Plan has identified existing beneficial uses. The beneficial uses of the Sacramento River, between the Colusa Basin Drain and I Street Bridge, as identified in Table II-1 of the Basin Plan, are municipal and domestic supply, agricultural irrigation, water contact recreation including canoeing and rafting, non-contact water

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recreation including aesthetic enjoyment, warm and cold freshwater habitats including preservation or enhancement of fish and invertebrates, migration habitat for warm and cold water species, warm and cold water spawning habitat, wildlife habitat, and navigation. Other beneficial uses identified in the Basin Plan apply to the Sacramento River, between the Colusa Basin Drain and I Street Bridge, including groundwater recharge, freshwater replenishment, and preservation of biological habitats of special significance (including the Sacramento San Joaquin Delta).

Rock Creek, Dry Creek, and Coon Creek are also tributary to Camp Far West Reservoir and the Bear River, via Camp Far West Ditch. The Bear River is the first body of water downstream of Rock Creek, for which the Basin Plan has identified existing beneficial uses. Table II-1 of the Basin Plan identifies existing and potential beneficial uses for the Bear River, including municipal and domestic supply, agricultural irrigation and stock watering, power supply, water contact recreation including canoeing and rafting, non-contact water recreation including aesthetic enjoyment, warm and cold freshwater habitats including preservation or enhancement of fish and invertebrates, migration habitat for warm and cold water species, warm and cold water spawning habitat, and wildlife habitat. Other beneficial uses identified in the Basin Plan apply to the Bear River, including groundwater recharge and freshwater replenishment. Upon review of the flow conditions, habitat values, and current uses of Coon Creek, Dry Creek, and Rock Creek, and applicability of the following factors: hydraulic continuity, aquatic life migration, existing and potential water rights, existing contact recreation, the beneficial uses identified in the Basin Plan for the Bear River are applicable to Coon Creek, Dry Creek, and Rock Creek.

The beneficial uses identified in the Basin Plan for the Sacramento River, between the Colusa Basin Drain and I Street Bridge, and for the Bear River are applicable to Coon Creek, Dry Creek, and Rock Creek, based upon the following:

The State Water Resources Control Board (SWRCB) has recorded numerous water rights, for domestic uses, on Main Canal and downstream waters, the Sacramento River, the Bear River, and the Feather River, downstream of the discharge. Many of the downstream waterways are managed by irrigation districts and retain the domestic and irrigation beneficial uses. Nevada Irrigation District (NID) controls the flows in Dry Creek, Coon Creek, and Camp Far West Ditch. Staff of NID reported that one homeowner uses water from Camp Far West Ditch for in-home domestic use. NID requires the homeowner to purchase 5 gallons of drinking water per month. NID sells water from Coon Creek and Camp Far West Ditch for family garden use and pasture irrigation. Over a distance of approximately 25 miles on Camp Far West Ditch, there are 37 irrigation customers.

Riparian Rights, for landowners along streams and rivers, are not recorded with the SWRCB and have precedence over other water rights.

Rock Creek and Dry Creek are low flow streams and may provide groundwater recharge during periods of low flow. Groundwater is a source of drinking water. In addition to the existing

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water uses, growth in the area downstream of the discharge is expected to continue, creating potential for increased domestic and agricultural uses of the water downstream of the discharge.

The discharge of treated wastewater to Rock Creek will not impact the power supply beneficial use of the downstream waters.

The WWTP discharges to Rock Creek, which is tributary to Dry Creek and Coon Creek. Water from Coon Creek is diverted to Camp Far West Ditch, Yankee Slough, Camp Far West Reservoir, the Bear River, and the Feather River. In western Placer County and eastern Sutter County Coon Creek is tributary to various sloughs and canals, Natomas Cross Canal, and the Sacramento River.

Hikers and campers, in the relatively uninhabited areas near the discharge point, Rock Creek, Dry Creek, upper Coon Creek, and Camp Far West Ditch have a reasonable expectation that those waters are as unpolluted as similar streams in the vicinity.

There is public access to Rock Creek, Dry Creek, Coon Creek, Camp Far West Ditch, Camp Far West Reservoir, the Bear River, the Feather River, the sloughs and canals that are downstream of Coon Creek, Natomas Cross Canal, and the Sacramento River. Several swimming and picnic areas were observed on the banks of Dry Creek and Coon Creek. Properties along Dry Creek and upper Coon Creek are single-family dwellings. The properties have relatively flat terrain that slopes down to the Creeks in their back yards. Public use is likely to increase as the population increases. Exclusion or restriction of public use is unrealistic.

Camp Far West Reservoir, the Bear River, the Feather River, and the Sacramento River are used extensively for contact and non-contact recreation.

The wastewater is discharged into Rock Creek, which flows into Dry Creek, Coon Creek, and downstream waters. The California Department of Fish and Game (DFG) has verified the presence of year-round warm water fisheries and cold-water fisheries for salmonids. Riparian habitats are also a by-product of drainages and canals and provide numerous habitats for birds and mammals.

Pursuant to the Basin Plan Tributary Rule, the cold and warm water habitat beneficial use designations of the Sacramento River and Bear River apply to Rock Creek, Dry Creek, and Coon Creek. The cold-water habitat designations necessitate that the in-stream dissolved oxygen concentration be maintained at, or above, 7.0 mg/l. However, if at the time of monitoring, the naturally occurring in-stream dissolved oxygen concentration is below 7.0 mg/l, the Discharger is not required to improve the dissolved oxygen concentration of the receiving stream.

The U.S. Fish and Wildlife Service has designated the streams and rivers in the Sierra foothills, including Rock Creek, Dry Creek, Coon Creek, and Camp Far West Ditch, to be potential habitat

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for Red-Legged Frogs. DFG confirmed that the same drainages maintain habitat for Foothill Yellow-legged Frogs and Western Pond Turtles (species of concern) and a variety of macro invertebrates.

The area surrounding the watersheds containing Rock Creek, Dry Creek, upper Coon Creek, Camp Far West Ditch, and downstream waters, is sparsely populated and therefore provides a wide variety of habitat for wildlife.

The discharge of treated wastewater to Rock Creek will not impact the navigation beneficial use of the downstream waters.

In areas where the groundwater elevation is below the bottom of a stream, water from the stream will percolate to the groundwater. During dry weather in many places in California, flowing streams experience these conditions, thus providing groundwater recharge. Rock Creek and the downstream waters may contribute to groundwater recharge.

The discharge to Rock Creek contributes to the quantity and may impact the quality of the water in the downstream waters, including Camp Far West Reservoir, and the Bear, Feather, and Sacramento Rivers.

Upstream of the discharge from the WWTP, flows in Rock Creek and Dry Creek are both dependent on the flows released from upstream reservoirs; Rock Creek Lake and Halsey Afterbay, respectively. General information, from U.S. Geological Survey maps and site visits, indicates that Rock Creek and Dry Creek were intermittent streams prior to the year-round discharge. Based on the available information, Rock Creek and Dry Creek currently are low-flow or intermittent streams, in the absence of the discharge from the WWTP or the upstream reservoirs. The beneficial uses of Rock Creek and Dry Creek must be protected. However due to the low-flow/intermittent nature of the flows in the Creeks, no credit for receiving water dilution is available. Although the discharge flows may maintain aquatic habitat during low flow conditions, constituents may not be discharged that may cause harm to aquatic life. At other times, natural flow and released flows help support cold-water aquatic life. Dry weather and low flow conditions occur primarily in the summer months but also occur throughout the year, particularly in low rainfall years. Significant dilution may occur during and after high rainfall events. However, the lack of available dilution during low flow periods results in more stringent effluent limitations to protect recreational uses, drinking water standards, agricultural water quality goals, and aquatic life.

At times, treated wastewater may be the main (or only) source of stream flow, with little or no dilution from natural flow, particularly in Rock Creek. The worst-case dilution in Rock Creek and Dry Creek is assumed to be zero to provide protection for the receiving water beneficial uses. The impact, of assuming zero dilution within the receiving water, is that discharge limitations based on acute and chronic toxicity must be end-of-pipe limits, rather than allowing for the dilution provided by the receiving water. End-of-pipe effluent limitations are included in the proposed Order.

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Rock and Dry Creeks, prior to construction of the WWTP and upstream reservoirs, were low flow or intermittent streams during dry weather and contained water primarily during wet weather. Since construction of the upstream reservoirs and the WWTP, during dry weather and low flow periods, Rock Creek and Dry Creek may be dominated by effluent. During low flow periods, Rock and Dry Creeks provide little or no dilution for wastewater effluent discharged from the WWTP. The wastewater discharged from the WWTP into Rock Creek, and downstream waters, can be reused for the beneficial uses listed above, particularly municipal, domestic, contact recreation, agricultural irrigation, and aquatic life.

Wastewater Regionalization

The Discharger has actively pursued wastewater regionalization at the new City of Lincoln wastewater treatment plant for numerous Placer County treatment systems, including SMD-1. The City of Lincoln has fully supported the regionalization efforts by constructing an “expandable” wastewater treatment plant and constructing an oversized influent pipeline to the City limits. To date the Discharger has been successful in securing significant federal funding for planning, environmental review and preliminary design work. Environmental analysis, both CEQA and NEPA, have not yet begun. There is a sequential chain of events that must occur before the SMD-1 facility could reasonably be expected to tie-into the regional system. The new development of Bickford Ranch and the City of Auburn lie between SMD-1 and the SMD-1 service area. The Bickford Ranch development is being challenged on environmental issues. The City of Auburn has committed to wastewater regionalization, yet has not conducted a cost effective analysis. The Discharger contends that additional federal funding, which has not yet been appropriated, is necessary for regionalization to move forward. To date, none of the potential dischargers to the regional facility have made a financial commitment to construct the necessary discharge pipeline or to purchase capacity at Lincoln. The Discharger has, however asked the Regional Board to extend compliance dates for ammonia, nitrates, CTR constituents and equivalent to tertiary treatment based discharge limitations in The permit until a final determination has been made regarding wastewater regionalization. The Discharger has proposed that by 2 January 2008, based on the outcome of the environmental analysis, the status of additional federal funding, completion of a cost effective analysis and a regional wastewater commitment by Bickford Ranch and the City of Auburn, a determination can be made regarding whether wastewater regionalization is the appropriate means of achieving compliance for the SMD-1 wastewater treatment plant. If regionalization is selected, this information would be considered “new information” under federal regulations, 40 CFR 122.44 (l)(i)(B)(1), and the permit may be reopened for reconsideration of the compliance periods in accordance with applicable laws and regulations. After 2 January 2008, if wastewater regionalization is not the selected compliance alternative, the Discharger has agreed that there would be sufficient time remaining under the currently included compliance period to complete and implement measures to achieve full compliance with the permit.

Tertiary Treatment

The principal infectious agents (pathogens) that may be present in raw sewage are classified into three broad groups: bacteria, parasites, and viruses. Tertiary treatment, consisting of chemical coagulation, sedimentation, and filtration, has been found to remove approximately 99.5% of viruses. The filtration process is an effective means of reducing viruses and parasites from the waste stream. The wastewater must be treated to tertiary standards (filtered) to protect contact recreation and food crop irrigation uses.

In the California Code of Regulations, Title 22, Division 4, Chapter 3 (Title 22), the California Department of Health Services (DHS) has developed standards for the reuse or reclamation of wastewater. Title 22 requires, for reuse of wastewater for spray irrigation of food crops, parks, playgrounds, schoolyards, other areas of similar public access, and unrestricted contact recreation, that wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the total coliform organism levels in the effluent not exceed 2.2 MPN/100 ml (Most Probable Number per 100 milliliters), as a 7-Day Median. The required level of treatment is tertiary or equivalent. The Title 22 standards are the minimum wastewater treatment standards necessary to protect public health when wastewater is reused for beneficial uses. There are wastewater treatment processes that provide an equivalent pathogen removal, such as membrane technologies, which could also be utilized to protect the beneficial uses of the receiving stream.

Title 22 standards are not directly applicable to surface waters that receive wastewater and the subsequent reuse of the combined surface water/wastewater. However, the Regional Board finds that it is appropriate to require an equivalent level of treatment to the DHS reclamation criteria because Rock Creek and downstream waters are used for irrigation of agricultural land, for contact recreation and for domestic uses. The permit does not apply Title 22 standards to the discharge of wastewater from SMD1. However, in assessing the discharge standards necessary to protect the site-specific beneficial uses of Rock Creek and Dry Creek, Title 22 standards were compared to the level of treatment required to protect public health when in contact with treated wastewater or when directly using undiluted effluent for food crop irrigation. Rock Creek and Dry Creek, as intermittent/low flow streams, are essentially the same as any other conveyance system (pipe or canal) when upstream flows are not present for dilution. DHS has determined that a specific level of treatment is required for reclaimed water delivered in dedicated pipes or canals. Therefore, to protect public health, the same level of treatment is required for water that is delivered in a streambed for the same uses.

It is not practicable to sample wastewater effluent for individual viruses and parasites. Therefore, the number of bacteria, measured as Total Coliform Organisms, in wastewater is an indicator of the effectiveness of the entire treatment train and the effectiveness of pathogen removal. A tertiary or equivalent treatment system is able to achieve a Total Coliform Organism level of 2.2 MPN/100 ml as a 7-Day Median. As an "indicator", solely complying with the total coliform limitation does not indicate that a "tertiary" level of treatment has been provided. The method of treatment is not prescribed in The permit; however, wastewater must be treated to a level equivalent to the tertiary standards recommended by DHS.

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As another indicator of effective treatment, a tertiary or equivalent treatment system is also capable of reliably achieving turbidity levels of 2 NTU (Nephelometric Turbidity Units) as a daily average. Failure or bypass of the filtration system, and corresponding reduced removal of viruses, would normally result in an increase in the number of particles in the effluent and higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations.

In addition to coliform testing, a turbidity effluent limit has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. In addition, tertiary treatment processes are able to reduce Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) to lower levels than can be achieved with secondary treatment processes alone. The 30-Day Average BOD and TSS effluent limits for secondary treatment have been revised to 10 mg/l, which is technically based on the capability of a tertiary system.

The requirement to provide tertiary treatment, or equivalent, is based on Regional Board staff's documentation of contact recreation, food crop irrigation and municipal and domestic uses of the receiving stream. Tertiary or equivalent treatment is consistent with the technical analysis conducted to develop the reclamation requirements of California Code of Regulations Title 22, and recommendations from the California Department of Health Services (DHS) contained in *Wastewater Disinfection for Health Protection* (1987), *Technical Justification for the Dilution Ratio for Secondary Effluent* (SDHS), the *Uniform Guidelines for the Disinfection of Wastewater* (1987) and the *Department of Health Services Recommendations for Waste Discharge Requirements* (1 July 2003).

Coagulation and filtration are also effective processes for reducing concentrations of some metals and other pollutants from the waste stream. Discharge of unfiltered water may result in an increase in violations of effluent limitations for some metals that are primarily based on toxicity to aquatic life.

Tertiary treatment, or equivalent, is necessary to protect the beneficial uses of the receiving stream. The Discharger's wastewater treatment system provides tertiary treatment. However, flows greater than 3.5 mgd are routed around the gravity filters to the chlorine contact basins. However, wet weather flows, due to inflow and infiltration (I/I), have exceeded 8 mgd. Currently, flows in excess of 3.5 mgd will receive a secondary level treatment but be routed around the gravity filters and flow directly to the chlorine contact basins. Wastewater discharged during periods of high flow is some combination of tertiary and secondary. The permit requires tertiary treatment, or equivalent, for all flows less than 3.5 mgd and utilization of the coagulation and filtration processes to the maximum extent practicable during wet weather.

Prior to permit renewal, anticipating a requirement to provide full tertiary treatment, the Discharger consulted with DHS staff. In a 15 July 2003 letter to Regional Board staff regarding conditions at SMD1 specifically, after their review of costs to expand to year-round tertiary and the high influent flow rates, DHS noted several exceptions to the need for tertiary treatment at SMD1 as follows:

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- "1. The plant is subject to very high flow rates during, and immediately following storm events. Plant flow that exceeds the capacity of the filters can be allowed to bypass the filtration process during these events, provided the filter capacity is at least 30% greater than the permitted average dry weather flow.*
- 2. A 30-day median coliform bacteria count of 2.2 MPN/100 ml can be allowed during the cold weather season. This season can be defined either on the basis of months (e.g., November 1 through April 30), or by receiving water temperature. If you decide to implement the latter, we recommend that the 'cold weather season' be defined as beginning when the seven day median receiving water temperature first falls below 60°F, and ending when the seven-day median receiving water temperature first rises above 60°F."*

A discharge in accordance with the DHS recommendation will not protect contact recreation, food crop irrigation and domestic and municipal beneficial uses during periods when the receiving water temperature is less than 60° F and treatment plant effluent flows exceed 3.5 mgd. The beneficial uses of the receiving waters immediately downstream of the discharge have been well documented. There is no documentation that water contact recreational activities cease at 60° F, to the contrary the nearby American River has well documented periods of contact recreational activity when water temperatures are below 60 ° F. The discharge of blended secondary effluent, compared to a full tertiary discharge, will result in the discharge of additional pollutants. The assessment of compliance with CTR standards and water quality objectives was based on tertiary treatment, and the blended discharge will likely not comply, threatening to degrade numerous beneficial uses, including the protection of aquatic life and drinking water. To protect the public health for confirmed downstream domestic uses, such as the City of Jackson, DHS has recommended that tertiary plus 20-to-1 dilution is necessary to protect domestic beneficial uses. Domestic uses have been documented to exist downstream of SMD-1. A tertiary level of treatment, or equivalent, is necessary to protect the beneficial uses of the receiving stream.

The Discharger's wastewater system has a high wet weather peaking factor, allowing elevated wet weather flows into the collection system. Reduction of I/I flows into the collection system will reduce the need for additional filtration. The permit includes a Provision that requires the Discharger to complete and implement an effective I/I reduction plan.

The permit requires that the Discharger may not discharge unfiltered wastewater in any amount, unless the influent flow is greater than 3.5 mgd and the 7-Day Median receiving water temperature is less than 60 °F. The permit contains effluent limitations for tertiary treated wastewater when flow is less than or equal to 3.5 mgd for Total Coliform Organisms, BOD, TSS, and Turbidity. When flow is greater than 3.5 mgd and Temperature is less than 60 °F as a 7-Day Median, The permit contains an effluent limitation for Total Coliform Organism of 2.2 MPN/100 ml as a 30-Day Median as recommended by DHS. To accommodate the discharge of commingled tertiary/secondary wastewater, The permit also contains interim effluent limitations for BOD, TSS, and turbidity that are less stringent than tertiary limits.

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As recommended by DHS, when discharging commingled wastewater, additional weekly monitoring is required for Total Coliform Organisms, Fecal Coliform Organisms, *Escherichia coli*, and Salmonella bacteria. In order to determine when the temperature of the receiving water has achieved less than 60 °F as a 7-Day Median, additional temperature monitoring will be necessary. The existing flow measurements in Rock Creek, Dry Creek, and plant effluent flow monitoring are not adequate for high flows and The permit requires they be upgraded to accurately measure dilution flow ratios while discharging less than tertiary quality effluent. To determine compliance with the lesser treatment requirements recommended by DHS, additional flow measurement will be required for the effluent from the plant, effluent from the gravity filters, flow to the chlorine contact basins, and flows in Rock and Dry Creeks.

The permit contains Effluent Limitations less stringent than full tertiary treatment limits during wet weather flow periods when the receiving water temperature is less than 60° F, as recommended by DHS. Tertiary treatment, or equivalent, is necessary to protect the designated beneficial uses of contact recreation, food crop irrigation and domestic and municipal supply. Similar local communities, some with higher wet weather peaking factors, Auburn, Placerville, El Dorado Hills and Cameron Park all provide, or are in the process of completing projects to provide, full tertiary treatment for wet weather flows. Upon expansion, the Regional Board finds that providing best practicable treatment or control (BPTC) of the discharge will require tertiary treatment for all flows.

Until the wastewater treatment facility is expanded or closed to tie into the Regional Wastewater Plant, the permit allows a treatment level less than tertiary, or equivalent, during periods of high flow and cold temperature. The permit requires that the Discharger conduct an analysis to determine if bypassing filtration during these limited periods provides BPTC in accordance with State Board Resolution No. 68-16, the antidegradation policy. The BPTC analysis will be due prior to making a decision of whether regionalization is feasible and will require analysis of at least the following:

- Whether 20-to-1 dilution (receiving stream flows to effluent flow) exists during wet weather periods,
- Identification and prioritization of wet weather flows in a comprehensive I/I reduction program to assess the amount of flow reduction that can be expected to be achieved,
- A flow equalization analysis to contain the “excess” wet weather flows,
- An analysis of tertiary treatment design parameters for dry and wet weather flow rates to determine the actual current dry and wet weather design of the filtration system,
- A treatability analysis to determine what treatment train will be necessary to comply with CTR limitations,
- An analysis of the SMD-1 system, what parameters make it, the service area and the downstream beneficial uses unique to receive relaxed wet weather effluent limitations in providing BPTC,
- A complete and thorough cost analysis of maximizing I/I, providing additional treatment to comply with CTR based limitations, adding equalization basins, building additional filters, tying into the regional wastewater plant and any other alternatives evaluated. The cost analysis must

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contain a detailed basis for the total costs and an assessment of monthly per household/increases for each alternative.

If wastewater regionalization is not the selected alternative and based on the findings of the BPTC analysis, the permit may be reopened and additional equivalent to tertiary discharge limitations may be added to protect the beneficial uses of the receiving waters.

The Basin Plan's surface water quality bacteria objective of 200 MPN/100 ml, for fecal coliform organisms, is based on Federal Standards for contact recreational use of surface waters. U.S. EPA, in the *Ambient Water Quality Criteria for Bacteria* (1986), estimates that compliance with the fecal coliform fresh surface water criteria of 200 MPN/100 ml will result in approximately eight illnesses per 1,000 swimmers. In a 28 September 2000 letter to Regional and District Engineers at DHS, the DHS stated that "Federal Standards for water quality where recreational bathing may occur were developed for freshwaters which are not directly influenced by sewage discharges (treated or untreated)." The DHS has documented the reduction of pathogens from various wastewater treatment processes. According to DHS; providing a secondary disinfected quality achieves a 1 to 4 log reduction and a tertiary disinfected quality achieves a 4 to 6 log reduction of viruses from raw sewage. The DHS projected that approximately one illness per 220 bathers would occur from recreation contact in secondary disinfected wastewater which drops to a more acceptable level of approximately one illness per 1,000 bathers with tertiary treatment.

The permit contains Effluent Limitations more stringent than the Basin Plan objective for bacteria and requires a tertiary level of treatment, or equivalent, necessary to protect the beneficial uses of the receiving water in addition to contact recreation of municipal and domestic uses, and food crop irrigation. Although the Discharger provides tertiary treatment except during high flow conditions, in accordance with California Water Code, Section 13241, the Regional Board considered the following:

- a. As stated above, Regional Board staff have site-specifically identified the past, present and probable future beneficial uses of the receiving stream to include municipal and domestic uses, contact recreation, and food crop irrigation.
- b. The environmental characteristics of the hydrographic unit including the quality of water available will be improved by the requirement to provide tertiary treatment for this wastewater discharge. Tertiary treatment will allow for the reuse of the undiluted wastewater for food crop irrigation and contact recreation activities that would otherwise be unsafe according to recommendations from the California Department of Health Services (DHS). The DHS has also stated that domestic or municipal uses are not protected by a tertiary level of treatment.
- c. In conformance with Section 101(a)(2) of the Clean Water Act (CWA), "fishable and swimmable" water quality conditions can be reasonably achieved through the coordinated control of all factors that affect water quality in the area. In recommending to allow partial filtration system bypass during periods when the receiving stream is less than 60° F, the DHS

is stating that it is not reasonable that the receiving waters will be used for recreational purposes and a “swimmable” condition need not be achieved under certain conditions. The discharge of a less than tertiary quality will also result in the discharge of additional pollutants which could degrade aquatic life uses of the receiving stream. Implementation of a tertiary or equivalent level of treatment will achieve compliance with the CWA goals of “fishable and swimmable” waters on a year round basis.

- d. The economic impact of requiring an increased level of treatment was considered.

The Discharger has estimated that the construction cost to achieve year-round filtration, with the same type of filters already at SMD1, is approximately \$1,000,000 per million gallons per day of additional capacity, or a minimum of \$5,000,000. This assumption is based on average dry weather design flow rates, utilizing the operational range of treatment systems at peak wet weather flow conditions, installation of sufficient additional filters could cost significantly less than projected by the City. Peak wet weather flow rate is the problematic parameter at this facility with respect to providing tertiary treatment. Other wastewater dischargers in the area successfully utilize more than one type of filtration. The costs to add the “same type” of filters at SMD-1 eliminates any opportunity for cost savings.

Regional Board and State Board staff gathered information relating to the City of Auburn Wastewater Treatment Plant improvements. The City of Auburn installed new continuous backwash Dynasand Filters to handle 6 mgd of flow. The cost of the filters and associated infrastructure was \$1.9 million. Included in the cost were concrete structures, pumps, a rapid mix tank, a chemical building, electrical work, piping, and the filters themselves. Accounting for inflation, the cost today would be approximately 20% higher, resulting in a cost of \$2.2 - \$2.3 million for filters and associated structures for a flow of 6 mgd. The approximate cost per million gallons would be \$370,000 – \$380,000. The initial costs are less with the Dynasand Filters but operation and maintenance costs are higher than other filters.

The cost of additional filtration is only necessary to offset the cost to treat wet weather flows above 3.5 mgd. Reducing I/I flows would reduce the cost of additional filters. The cost of reducing I/I and the associated reduced need for additional filters could not be assessed with the available information.

The loss of beneficial uses within downstream waters, without the tertiary treatment requirement, include prohibiting domestic uses, the irrigation of food crops and prohibiting public access for contact recreational purposes, would have a detrimental economic impact.

The Discharger has not assessed the means of compliance with effluent limitations for individual pollutants. In addition to pathogen removal to protect irrigation and recreation,

tertiary treatment may also aid in meeting discharge limitations for other pollutants, such as heavy metals, reducing the need for potentially expensive advanced treatment.

- e. The need to develop housing in the area will not be significantly impacted by the requirement for tertiary treatment. The level of tertiary treatment is not being increased over that which is already being provided by the Discharger.
- f. It is the Regional Board's policy, (Basin Plan, page IV-15.00, Policy 2) to encourage the reuse of wastewater. The Regional Board requires Dischargers to evaluate how reuse or land disposal of wastewater can be optimized. The need to develop and use recycled water is facilitated by providing a tertiary level of wastewater treatment that will allow for a greater variety of uses in accordance with California Code of Regulations, Title 22.

The Regional Board's Basin Plan, page IV-17.00, contains an implementation policy ("Policy for Application of Water Quality Objectives") that specifies that the Regional Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.*" This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Board must establish effluent limitations using one or more of three specified sources, including EPA's published water quality criteria, a proposed state criterion (*i.e.*, water quality objective), or an explicit state policy interpreting its narrative water quality criteria (*i.e.*, the Regional Board's "Policy for Application of Water Quality Objectives")(40 C.F.R. 122.44(d)(1) (vi) (A), (B) or (C)). The Basin Plan contains a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*". The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. The beneficial uses include municipal and domestic supply, agricultural irrigation supply, water contact and non-contact recreation and aquatic habitat and migration. The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Regional Board may apply limits more stringent than MCLs. When a reasonable potential exists for exceeding a narrative objective, Federal Regulations mandate numerical effluent limitations and the Basin Plan narrative criteria clearly establish a procedure for translating the narrative objectives into numerical effluent limitations.

Mixing Zone And Dilution Credits

In establishing Effluent Limitations for constituents listed in the NTR and CTR, the RWQCB may grant mixing zones and dilution credits to dischargers in accordance with provisions of Section 1.4.2 of the

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SIP. The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by the RWQCB. Mixing zone, dilution credit, and other terms used in their calculation are defined in the SIP as follows:

DILUTION CREDIT is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water. (Represented as D in calculations of effluent limitations.)

MIXING ZONE is a **limited** volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

COMPLETELY-MIXED DISCHARGE condition means not more than 5 percent difference, accounting for analytical variability, in the concentration of a pollutant exists across a transect of the water body at a point within two stream/river widths from the discharge point.

INCOMPLETELY-MIXED DISCHARGE is a discharge that contributes to a condition that does not meet the meaning of a completely-mixed discharge condition.

DILUTION RATIO is the critical low flow of the upstream receiving water divided by the flow of the effluent discharged.

1Q10 is the lowest flow that occurs for one day with a statistical frequency of once every 10 years.

7Q10 is the average low flow that occurs for seven consecutive days with a statistical frequency of once every 10 years.

Dilution credits may be limited or denied on a pollutant-by-pollutant basis, which may result in a dilution credit for all, some, or no priority pollutants in a discharge. Before establishing a mixing zone and a dilution credit for a discharge, it must first be determined if, and how much (if any), receiving water is available to dilute the discharge. In determining the appropriate available receiving water flow, the RWQCB may take into account actual and seasonal variations of the receiving water and the effluent. For example, the RWQCB may prohibit mixing zones during seasonal low flows and allow them during seasonal high flows.

The SIP specifies that “*A mixing zone shall be as small as practicable*”, and includes a list of requirements for allowing a mixing zone, information requirements, and instructions for calculating dilution ratios. The SIP also states “*The application for the [NPDES] permit shall include, to the extent feasible, the information needed by the RWQCB to make a determination on allowing a mixing zone, including calculations for deriving the appropriate receiving water and effluent flows, and/or the results of a mixing zone study. If the results of the mixing zone study are unavailable by the time of permit issuance/reissue, the RWQCB may establish interim requirements...*” The approach to making a mixing zone determination also depends on whether a discharge is completely-mixed or incompletely-mixed with the receiving water.

The SIP states “*Dilution credits and mixing zones for incompletely mixed discharges shall be considered by the RWQCB only after the discharger has completed an independent mixing zone study and demonstrated to the satisfaction of the RWQCB that a dilution credit is appropriate.*” The Discharger has not completed a mixing zone study for SMD1.

The SIP states “*For completely-mixed discharges, as determined by the RWQCB and based on information provided by the discharger, the amount of receiving water available to dilute the effluent shall be determined by calculating the dilution ratio (i.e., the critical receiving water flow divided by the effluent flow) using the appropriate flows in Table 3. In no case shall the RWQCB grant a dilution credit that is greater than the calculated dilution ratio.*” As shown in Table 3 of the SIP, to calculate the dilution ratios, the 1Q10 and 7Q10 must be calculated from sufficient data provided by the Discharger. The Discharger has not provided sufficient data for the 1Q10 and 7Q10 calculations.

The Discharger has not submitted the necessary information to make a mixing zone and dilution credit determination. In addition, the receiving water for SMD1 (Rock Creek) is an effluent dominated water body. When the effluent flow exceeds the flow of Rock Creek, it appears that a mixing zone allowance would violate two requirements of the SIP, which states in Section 1.4.2.2.A.:

“*A mixing zone shall not:*

(1) compromise the integrity of the entire water body; ...

(10) dominate the receiving water body...”

Without the information necessary to determine whether a mixing zone and dilution credits are applicable and with the information that Rock Creek is effluent dominated, at times, Regional Board staff must conclude that a dilution credit and mixing zone are not appropriate (D = 0).

Effluent Limits

National and California Toxics Rules

U.S. EPA adopted the *National Toxics Rule* on 5 February 1993 and the *California Toxics Rule* on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Plan or SIP), which contains guidance on implementation of the *National Toxics Rule* (NTR) and the *California Toxics Rule* (CTR).

Excursions Above Narrative and Numeric Water Quality Standards

Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. To implement requirements of the SIP, the Discharger’s

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Report of Waste Discharge contained information as to whether the levels of NTR, CTR, or other pollutants in the discharge from the WWTP would cause or contribute to an in-stream excursion above a water quality or Basin Plan numeric or narrative objective. The Discharger collected the required samples, submitted them for analysis, and once the results were complete, submitted the results in a report titled “*Effluent and Receiving Water Quality Assessment for the Sewer Maintenance District No. 1 Wastewater Treatment Plant*”, dated 28 February 2003. Tables 1 through 6 contain a summary of the laboratory analytical results contained in the report. Based on the Discharger’s information (also including monthly Monitoring Reports), Regional Board staff has calculated effluent limitations and included them in the proposed Order. Effluent Limitations are discussed in further detail below.

Basin Plan Numeric Water Quality Objectives

Section 13263.6(a), California Water Code (CWC), requires that “*the regional board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW [Publicly Owned Treatment Works] for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. [United States Code] Sec. 11023) [EPCRA] indicate as discharged into the POTW, for which the state board or the regional board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective.*”

Section III of the Basin Plan contains water quality objectives for the Central Valley Region. Table III-1, Trace Element Water Quality Objectives, contains numeric water quality objectives for the Sacramento River from Keswick Dam to the I Street Bridge, for Arsenic, Barium, Copper, Cyanide, Iron, Manganese, Silver, and Zinc. The discharge from the WWTP is discharged to Rock Creek, an eventual tributary to the Sacramento River between Keswick Dam and the I Street Bridge.

In the Basin Plan, Table III-3, Electrical Conductivity and Total Dissolved Solids, contains numeric water quality objectives for the Sacramento River at the I Street Bridge, for Electrical Conductivity. The numeric objectives are 240 micromhos/cm (50 percentile) or 340 micromhos/cm (90 percentile).

Table III-3 also contains numeric water quality objectives for Electrical Conductivity in the Feather River from the Fish Barrier Dam at Oroville to the Sacramento River. The discharge to Rock Creek is also eventually tributary to the Feather River between the Fish Barrier Dam and the Sacramento River. The numeric objective is 150 micromhos/cm (90 percentile).

The discharge into Rock Creek in central Placer County travels many miles of tributary waters, through western Placer County, eastern Sutter County, and northern Sacramento County before entering the Feather and Sacramento Rivers. It is not likely that the discharge from the WWTP into Rock Creek will impact the concentrations of Arsenic, Barium, Copper, Cyanide, Iron, Manganese, Silver, and Zinc, and the Electrical Conductivity in the Sacramento River or the Electrical Conductivity in the Feather River. Available effluent quality data indicate that none of these constituents have a reasonable potential to

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cause or contribute to an excursion above any numeric water quality objectives included in the Basin Plan for the Sacramento and Feather Rivers. Therefore, Effluent Limitations pursuant to CWC Section 13263.6(a) are not proposed for Arsenic, Barium, Copper, Cyanide, Iron, Manganese, Silver, Zinc, and Electrical Conductivity.

Required Effluent Limitations

Federal regulations also require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs the Regional Board finds that the discharge does have a reasonable potential to cause or contribute to an in-stream excursion above the following:

- A. Current Mercury levels in the Sacramento-San Joaquin Delta;
- B. Technology-based Effluent Limits, Title 22 equivalent, and tertiary water treatment objectives for Bacteria (Total Coliform Organisms), Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS), and Turbidity;
- C. The Basin Plan narrative Oil and Grease Water Quality Objective;
- D. The Basin Plan numeric pH Water Quality Objective;
- E. The Basin Plan narrative Pesticide Water Quality Objective, for Persistent Chlorinated Hydrocarbon Pesticides, including 2,4-D, DDE, Dalapon, Dinoseb, Endosulfan, Heptachlor Epoxide, and 2,4,5-TP (Silvex);
- F. The Basin Plan narrative Settleable Material Water Quality Objective for Settleable Solids;
- G. The Basin Plan narrative Toxicity Water Quality Objective for Survival of Aquatic Organisms;
- H. The Basin Plan narrative Toxicity Water Quality Objective for Aluminum, Ammonia, Atrazine, Chlorine Residual, Phthalate Esters (PAEs), and Tributyltin;
- I. The California Department of Health Services (DHS) Drinking Water Standards Primary Maximum Contaminant Levels (PMCLs) for Alachlor, Nitrate, and Nitrite, and the DHS Drinking Water Standards Secondary Maximum Contaminant Levels (SMCLs) for Manganese and Methyl Tert Butyl Ether (MTBE);
- J. CTR criteria for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, Polychlorinated Biphenyls (PCBs), Silver, and Zinc; and

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K. Other drinking water criteria for Chloroform.

Effluent Limitations for Alachlor, Aluminum, Ammonia, Atrazine, Bacteria, Bis(2-ethylhexyl)phthalate, BOD, Bromodichloromethane, Chlorine Residual, Chloroform, Copper, Dioxins and Furans, Lead, Manganese, Mercury, MTBE, Nitrate, Nitrite, Oil and Grease, PAEs, PCBs, pH, Persistent Chlorinated Hydrocarbon Pesticides, Settleable Solids, Silver, Survival of Aquatic Life, TSS, Tributyltin, Turbidity, and Zinc are included in the proposed Order.

Concentration-based Effluent Limitations, and in accordance with the Code of Federal Regulations, 40 CFR 122.45(f), mass-based Effluent Limitations are included for Alachlor, Aluminum, Ammonia, Atrazine, Bis(2-ethylhexyl)phthalate, BOD, Bromodichloromethane, Chlorine Residual, Chloroform, Copper, Dioxins and Furans, Lead, Manganese, Mercury, MTBE, Nitrate, Nitrite, Oil and Grease, PAEs, PCBs, Persistent Chlorinated Hydrocarbon Pesticides, Silver, TSS, Tributyltin, and Zinc. Mass-based limitations for these constituents (except Mercury; see below) are calculated using the equation:

$$(\text{Concentration-based Effluent Limitation}) \times (8.345) \times (\text{Average Daily Flow}) = \text{Mass-based Effluent Limitation}$$

$$X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$$

Where:

Average Daily Flow = 2.18 MGD

8.345 is the conversion factor to convert mg/l and MGD into lbs/day

X = Concentration-based Effluent Limitation

Y = Mass-based Effluent Limitation

Mercury

The CTR Human Health criterion for Mercury (expressed as total recoverable metal) in waters that are sources of drinking water (consumption of water and aquatic organisms) is 0.05 µg/l as a 30-day average. In the Code of Federal Regulations 40 CFR Part 131, U.S. EPA acknowledges that human health criteria may not be protective of some aquatic or endangered species. In the CTR, U.S. EPA reserved the Mercury criteria for fresh water and aquatic life and may adopt new criteria at a later date.

The Basin Plan contains a list (known as the 303(d) List) of Water Quality Limited Segments (WQLSs) that “are those sections of lakes, streams, rivers, or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate effluent limitations for point sources”. The Basin Plan goes on to state, “Additional treatment beyond minimum federal requirements will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.”

Wastewater from the treatment plant discharges to Rock Creek and eventually flows into the Sacramento River, which then flows to the Sacramento-San Joaquin Delta. The Sacramento-San Joaquin Delta has been listed as an impaired water body pursuant to Section 303(d) of the Clean Water Act, because of

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Mercury. Because the Sacramento-San Joaquin Delta has been listed as an impaired water body for Mercury, the discharge must not cause or contribute to an increase of Mercury levels. Section 1.3 of the SIP requires establishment of an Effluent Limitation when the detected concentration exceeds an applicable criterion or objective.

Effluent monitoring data recently submitted by the Discharger (see Table 1) showed total recoverable Mercury in twelve samples at concentrations of 0.00162, 0.00174, 0.00195, 0.00220, 0.00248, 0.00255, 0.0027, 0.0034, 0.00350, 0.0071, 0.0074, and 0.00987 µg/l. The reported concentrations of Mercury do not exceed the CTR Human Health criterion, therefore, a concentration-based Effluent Limitation is not proposed. However, the Effluent does contain a mass of Mercury, which may contribute to an increase in Mercury in the Sacramento-San Joaquin Delta. Therefore, a mass-based final Effluent Limitation for Mercury, in lbs/day, is included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The mass limit for Mercury is calculated using the maximum flow rate and maximum detected concentration $[(X \text{ mg/l}) \times (8.345) \times (\text{Max Flow Rate in MGD})] = Y \text{ lbs/day}$. This limitation is based on maintaining the Mercury loading at the current level until a Total Maximum Daily Load (TMDL) can be established and U.S. EPA develops Mercury standards that are protective of human health.

The highest average monthly flow reported within the last twelve months was 2.56 MGD in December 2002. Using the highest average monthly flow of 2.56 MGD and the maximum detected Mercury concentration of 0.00987 µg/l (0.00000987 mg/l), the approximate maximum mass of Mercury discharged monthly is 0.00021 lbs/day as a monthly average:

Mass-based Effluent Limitation for Mercury:

$$\Rightarrow 0.00000987 \text{ mg/l} \times 8.345 \times 2.56 \text{ MGD} \cong 0.00021 \text{ lbs/day as a Monthly Average}$$

The Mercury Effluent Limitation is based on current effluent concentrations. A schedule is not necessary for the Discharger to achieve compliance. If U.S. EPA develops new water quality standards for Mercury, the proposed Order may be reopened and new Effluent Limitations added and/or the existing Effluent Limitation adjusted, as appropriate.

Technology-based Effluent Limits and Title 22 - Total Coliform Organisms, BOD and TSS, and Turbidity

Title 22 equivalence and tertiary water treatment standards are described in Findings above and are applicable to this discharge. The existing gravity filters are only able to adequately filter flows up to 3.5 MGD and, consequently, the WWTP is currently unable to provide year-round tertiary treatment.

When flows > 3.5 MGD bypass the gravity filters, the discharge will be some combination of tertiary and secondary treated wastewater. Effluent limitations for BOD, TSS, and Turbidity are also impacted by a reduction in treatment. The proposed Order contains two sets of Effluent Limitations for Total

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Coliform Organisms, BOD and TSS, and Turbidity; for flows ≤ 3.5 MGD and for flows > 3.5 MGD (and when receiving water temperature < 60 °F as a 7-Day Median).

Based on DHS' written opinions, the proposed Order also contains additional weekly receiving water monitoring during bypass events, for Total Coliform Organisms, Fecal Coliform Organisms, *Escherichia coli*, and Salmonella Organisms. Additional receiving water temperature monitoring will also be required between 1 October and 30 May. Upgraded flow monitoring equipment will be required for the receiving streams, Rock Creek and Dry Creek. Additional flow monitoring will be required for the receiving streams, plant effluent, effluent from the gravity filters, and flow to the chlorine contact basins.

Effluent Limitations for Total Coliform Organisms, BOD and TSS, and Turbidity are described as follows:

Total Coliform Organisms

Existing Order No. 97-113 contains Effluent Limitations of 2.2 MPN/100 ml as a Monthly Median and 23 MPN/100 ml as a Daily Maximum from 1 May through 31 October, and 23 MPN/100 ml as a Monthly Median and 230 MPN/100 ml as a Daily Maximum from 1 November through 30 April.

Title 22 of the California Code of Regulations states that reclaimed water shall be considered adequately disinfected for spray irrigation purposes if the median value of Total Coliform Organisms does not exceed 2.2 MPN/100 ml for the last 7 days for which analyses have been completed, the number of total coliform bacteria does not exceed 23 MPN/100 ml in more than one sample in any 30 day period, and no sample shall exceed 240 MPN/100 ml. When flow ≤ 3.5 MGD, to provide Title 22-equivalent waters, the proposed Order contains final Effluent Limitations of 2.2 MPN/100 ml as 7-Day Median, 23 MPN/100 ml as a Daily Maximum that must not be exceeded more than once in 30 day period, and 240 MPN/100 ml as a Daily Maximum.

When flows are greater than 3.5 MGD and the 7-Day Median temperature of the receiving water < 60 °F, the proposed Order contains interim Effluent Limitations of 2.2 MPN/100 ml as a 30-Day Median and 23 MPN/100 ml as a Daily Maximum that must not be exceeded more than once in 30 day period, and 240 MPN/100 ml as a Daily Maximum.

Effluent Limitations for Total Coliform Organisms:

- ⇒ 2.2 MPN/100 ml as a 7-Day Median
- ⇒ 23 MPN/100 ml as a Daily Maximum, may be exceeded only once in 30 days
- ⇒ 240 MPN/100 ml as a Daily Maximum

Interim Effluent Limitations for flows > 3.5 MGD for Total Coliform Organisms:

- ⇒ 2.2 MPN/100 ml as a 30-Day Median
- ⇒ 23 MPN/100 ml as a Daily Maximum, may be exceeded only once in 30 days
- ⇒ 240 MPN/100 ml as a Daily Maximum

BOD and TSS

The Federal Water Pollution Control Act was adopted in 1972. The Act created the NPDES system for permitting wastewater discharges. The first NPDES permits focused on control of traditionally regulated pollutants, with emphasis on BOD, TSS, pH, oil and grease, and some metals, by requiring the use of Best Practicable Control Technology (BPT). The Act included a deadline for all facilities to be compliance with BPT and also established a compliance deadline for installing Best Available Technology (BAT). Most permits issued to industrial facilities contained effluent limits based on Best Professional Judgment (BPJ). In 1977, the Clean Water Act was adopted, which shifted emphasis from controlling conventional pollutants to controlling toxic discharges and extended the compliance deadline for BAT. The conventional pollutants (BOD, TSS, pH, fecal coliform organisms, and oil and grease) controlled by BPT in the first round of permits were now subject to a new level of control termed Best Conventional Pollutant Control Technology (BCT).

When developing effluent limits for an NPDES permit, pollutants controlled by BAT and BCT requirements generally have Technology-Based effluent limits. Technology-Based effluent limits for POTWs are derived from secondary treatment standards. Municipal wastewater is amenable to biological treatment. The biological component of a municipal treatment plant is termed secondary treatment and is usually preceded by simple settling (primary treatment). U.S. EPA evaluated performance data from secondary treatment facilities and established performance standards. Secondary treatment standards for both BOD and TSS are 30 mg/l as a 30-Day Average and 45 mg/l as a 7-Day Average, with an 85% removal rate.

Tertiary treatment is generally considered to include primary and secondary treatment, with coagulation and filtration. U.S. EPA has not established performance standards for tertiary treatment. However, based on observed treatment capabilities, tertiary treatment is able to achieve both BOD and TSS levels of 10 mg/l as a Monthly Average, 15 mg/l as a Weekly Average, and 25 mg/l as a Daily Maximum, with a minimum 85% removal rate.

Existing Order No. 97-113 contains seasonal Effluent Limitations of 10 mg/l (Monthly Average), 15 mg/l (Weekly Average), and 25 mg/l (Daily Maximum) for both BOD and TSS from 1 May through 31 October. From 1 November through 30 April, the existing Order contains Effluent Limitations of 20 mg/l (Monthly Average), 30 mg/l (Weekly Average), and 50 mg/l (Daily Maximum) for both BOD and TSS.

To provide Title 22 equivalent waters the proposed Order contains final Effluent Limitations of 10 mg/l (Monthly Average), 15 mg/l (Weekly Average), and 25 mg/l (Daily Maximum), with a minimum 85% removal rate, for both BOD and TSS, when flow \leq 3.5 MGD. These Limitations are based on the design technical capability of tertiary treatment systems.

When flows are greater than 3.5 MGD, the gravity filters will be bypassed and the discharge from the plant will be some combination of tertiary and secondary treated wastewater. When flow $>$ 3.5 MGD

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and the 7-Day Median temperature of the receiving water < 60 °F, the proposed Order contains interim Effluent Limitations of 20 mg/l (Monthly Average), 30 mg/l (Weekly Average), and 50 mg/l (Daily Maximum), with an 85% removal rate. These effluent limits are midway between secondary and tertiary treatment capabilities.

Final Concentration-based Effluent Limitations for BOD and TSS:

- ⇒ 10 mg/l as a Monthly Average
- ⇒ 15 mg/l as a Weekly Average
- ⇒ 25 mg/l as a Daily Maximum
- ⇒ 85% removal rate

Interim Concentration-based Effluent Limitations for flows > 3.5 MGD for BOD and TSS:

- ⇒ 20 mg/l as a Monthly Average
- ⇒ 30 mg/l as a Weekly Average
- ⇒ 50 mg/l as a Daily Maximum
- ⇒ 85% removal rate

Mass-based Effluent Limitations for both BOD and TSS are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The BOD and TSS mass limits are calculated using the concentration-based Effluent Limitations and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitations for BOD and TSS:

- ⇒ $10 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 182 \text{ lbs/day}$ as a Monthly Average
- ⇒ $15 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 273 \text{ lbs/day}$ as a Weekly Average
- ⇒ $25 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 455 \text{ lbs/day}$ as a Daily Maximum
- ⇒ 85% removal rate

Interim Mass-based Effluent Limitations for flows > 3.5 MGD for BOD and TSS:

- ⇒ $20 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 364 \text{ lbs/day}$ as a Monthly Average
- ⇒ $30 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 546 \text{ lbs/day}$ as a Weekly Average
- ⇒ $50 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 910 \text{ lbs/day}$ as a Daily Maximum
- ⇒ 85% removal rate

Turbidity

Existing Order No. 97-113 contains seasonal Effluent Limitations of 2 NTU as a Monthly Average and 5 NTU as a Daily Maximum from 1 May through 31 October. The existing Order contains no Turbidity limitation between 1 November and 30 April.

Title 22 criteria for filtered wastewater require that Turbidity not exceed; (a) an average of 2 NTU in a 24-Hour period, (b) 5 NTU more than 5% of the time in a 24-Hour period, and (c) 10 NTU at any time.

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To provide Title 22 equivalent water the proposed Order contains final Effluent Limitations of 2 NTU as a 24-Hour Average and a Daily Maximum between 5 NTU and 10 NTU, as described above, when flow \leq 3.5 MGD.

In the interim, the proposed Order contains no limitations when flow $>$ 3.5 MGD and the 7-Day Median temperature of the receiving water $<$ 60 °F.

Final Effluent Limitations for Turbidity:

- ⇒ 2 NTU as a 24-Hour Average
- ⇒ 5 NTU to be exceeded no more than 5% of the time within a 24-hour period
- ⇒ 10 NTU as a Daily Maximum

There are also year-round Receiving Water Limitations for Turbidity based on the Basin Plan water quality objective.

Basin Plan Water Quality Objective for Oil and Grease

The Basin Plan includes a water quality objective for oil and grease in surface waters, which states “*Waters shall not contain oils, greases, waxes, or other materials in such concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.*”

The term “grease” as commonly used in relation to food, food processing, and restaurants, includes fats, oil, and waxes. Grease content is determined by laboratory extraction of a waste sample with trichlorotrifluoroethane. Other extractable waste oils and greases include mineral oils, such as kerosene and lubricating and road oils. Fats and oils are compounds of alcohol or glycerin with fatty acids, and are composed of carbon, hydrogen, and oxygen in varying proportions. Fats and oils enter wastewater as butter, lard, margarine, vegetable fats and oil, meat, seeds, nuts, and certain fruits. Kerosene, lubricating and road oils are derived from petroleum and coal tar and are made up essentially of carbon and hydrogen. These oils reach the sewers from shops, garages, and streets. Greases and oils tend to coat surfaces, interfering with biological action and causing maintenance problems within WWTPs.

The Federal Water Pollution Control Act was adopted in 1972. The Act created the NPDES system for permitting wastewater discharges. The first NPDES permits focused on control of traditionally regulated pollutants, with emphasis on BOD, TSS, pH, oil and grease, and some metals, by requiring the use of Best Practicable Control Technology (BPT). The Act included a deadline for all facilities to be compliance with BPT and also established a compliance deadline for installing Best Available Technology (BAT). Most permits issued to industrial facilities contained effluent limits based on Best Professional Judgment (BPJ). In 1977, the Clean Water Act was adopted, which shifted emphasis from controlling conventional pollutants to controlling toxic discharges and extended the compliance deadline for BAT. The conventional pollutants (BOD, TSS, pH, fecal coliform organisms, and oil and grease) controlled by BPT in the first round of permits were now subject to a new level of control termed Best Conventional Pollutant Control Technology (BCT).

For Oil and Grease, U.S. EPA has developed National Ambient Water Quality Criteria for the Protection of Human Health for the consumption of water and fish that requires that surface water be “Virtually free from oil and grease, particularly from the tastes and odors that emanate from petroleum products.” U.S. EPA has also developed National Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life that states that Oil and Grease should be limited to “0.01 of the lowest continuous flow 96-hour LC50 to several important freshwater and marine species, each having a demonstrated high susceptibility to oils and petrochemicals; surface waters shall be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum derived oils.”

When developing effluent limits for an NPDES permit, pollutants controlled by the BAT and BCT requirements generally have Technology-Based Effluent Limits. For Oil and Grease, there are no numerical water quality standards on which to base Water Quality-Based Effluent Limits (except for Taste and Odor criteria for Total Petroleum Hydrocarbons). The Clean Water Act required secondary treatment standards for POTWs. The secondary treatment standards are the basis for Technology-Based Effluent Limits for POTWs. However, of the conventional pollutants, only BOD, TSS, and pH are included in the secondary treatment standards; Oil and Grease is not included.

Technology-Based Effluent Limitations

Observation and experience by treatment plant operators and regulators have found that oily waste having an average oil content less than 15 mg/l does not interfere extensively with operation and maintenance of WWTPs. Based on BPJ, existing Order No. 97-113 contains concentration-based Effluent Limitations for Oil and Grease of 10 mg/l as a Monthly Average and 15 mg/l as a Daily Maximum. The proposed Order contains the same concentration-based Effluent Limitations.

Concentration-based Effluent Limitations for Oil and Grease:

- ⇒ 10 mg/l as a Monthly Average
- ⇒ 15 mg/l as a Daily Maximum

New mass-based Effluent Limitations for Oil and Grease are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Oil and Grease mass limits are calculated using the concentration-based Effluent Limitations of 10 and 15 mg/l and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitations for Oil and Grease:

- ⇒ $10 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 182 \text{ lbs/day}$ as a Monthly Average
- ⇒ $15 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 273 \text{ lbs/day}$ as a Daily Maximum

Water Quality-Based Effluent Limitations/Taste and Odor

The California State Water Resources Control Board has established a Taste and Odor Threshold for Total Petroleum Hydrocarbons as Gasoline (TPHg) of 5 µg/l. U.S. EPA has established Suggested-No-

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Adverse-Response Levels for Taste and Odor for Total Petroleum Hydrocarbons as both Diesel Oil and as Kerosene (TPHd and TPHk) of 100 µg/l.

Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) are components of gasoline and MTBE is a gasoline additive. U.S. EPA has established Taste and Odor Thresholds for Ethylbenzene at 29 µg/l, MTBE at 20 µg/l, Toluene at 42 µg/l, and Xylenes at 17 µg/l. The Journal of Applied Toxicology published a Taste and Odor Threshold for Benzene of 170 µg/l. Monitoring data submitted by the Discharger contained results for BTEX and MTBE. The Discharger has not submitted monitoring data for TPHg, TPHd, or TPHk. Benzene, Ethylbenzene, and Xylenes were not detected. Toluene was detected at 0.98 µg/l, which is lower than both the PMCL of 150 µg/l and the Taste and Odor Threshold of 42 µg/l for Toluene. No Effluent Limitations are proposed for the BTEX constituents because Benzene, Ethylbenzene, and Xylenes were not detected and Toluene was detected at concentrations below the criteria. MTBE was detected at up to 3.8 µg/l. Through Reasonable Potential Analysis (see MTBE below), it was shown that there is a statistical possibility for MTBE concentrations to exceed the SMCL of 5 µg/l. An Effluent Limitation is proposed for MTBE based on the SMCL of 5 µg/l, which is also protective of the Taste and Odor Threshold of 20 µg/l for MTBE.

The BTEX constituents comprise only a portion of TPHg. Without analytical data for TPHg, TPHd, and TPHk, it is not possible to determine whether the effluent exceeds the Taste and Odor Thresholds and whether Effluent Limitations are necessary. Therefore, a Provision is included that requires monitoring for the presence of TPH. A reopener is included if monitoring shows that Effluent Limitations are necessary.

Basin Plan Water Quality Objective for pH

Section III of the Basin Plan contains a numeric Water Quality Objective for pH. Numeric Water Quality Objectives are commonly applied to the receiving water as Receiving Water Limitations. However, in this case, the flow of the receiving water has been characterized as a low flow/intermittent. Therefore, end-of-pipe Effluent Limitations have been included in the proposed Order for pH, as well as Receiving Water Limitations to be protective of the Water Quality Objectives.

On page III-5.00, the Basin Plan Water Quality Objective for pH states, *“The pH shall not be depressed below 6.5 or raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses.”* Cold-water habitat is a beneficial use of Rock and Dry Creek. To protect the cold-water habitat beneficial use, the proposed Order contains an Effluent Limitation based on the Basin Plan Water Quality Objective for pH.

Basin Plan Pesticide Water Quality Objective - Persistent Chlorinated Hydrocarbon Pesticides (2,4-D, DDE, Dalapon, Dinoseb, Endosulfan, Heptachlor Epoxide, and 2,4,5-TP)

Section III of the Basin Plan contains Water Quality Objectives for the Central Valley Region. The Pesticide Water Quality Objectives, on page III.6.00 of the Basin Plan, states *“Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency*

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[U.S. EPA] or the Executive Officer.” The Pesticide Water Quality Objective further states “*For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant, or (3) any breakdown products of these materials that threaten beneficial uses.*”

The Basin Plan does **not** contain a list of the pesticides, including herbicides and breakdown products of pesticides and herbicides, that are persistent, chlorinated hydrocarbons. The Basin Plan does not contain a definition of persistent or an explanation of the number of chlorine atoms that are required to define a chlorinated hydrocarbon. It should also be noted that PCBs are persistent in the environment and are chlorinated hydrocarbons, however, they are not pesticides. PCB’s are addressed elsewhere in the proposed Order.

For the purposes of the proposed Order, a persistent pesticide will be defined as a pesticide, and its breakdown products, that are stable within the environment and/or bioaccumulative. Further, a pesticide that is stable within the environment is not easily transformed by processes such as photolysis, oxidation, hydrolysis, volatilization, sorption, biotransformation, and/or biodegradation. Additionally, a pesticide that is bioaccumulative, means that the pesticide bioconcentrates, or concentrates within living tissues and organisms. The rates of bioaccumulation and persistence are relative and not defined in the proposed Order.

Several sources have been reviewed to determine which chemicals qualify as “*persistent, chlorinated hydrocarbon pesticides*”:

- A. The Code of California Regulations (CCR), Title 22, Section 66261.24, Table III, contains a “List of Organic Persistent and Bioaccumulative Toxic Substances”. The chlorinated hydrocarbon pesticides from Table III are listed below:

SUBSTANCE

Aldrin	Kepone
Chlordane	Lindane (Gamma BHC)
DDT, DDE, DDD	Methoxychlor
2,4-Dichlorophenoxyacetic acid	Mirex
(2,4-D)	Pentachlorophenol
Dieldrin	Toxaphene
Endrin	2,4,5-Trichlorophenoxypropionic acid
Heptachlor	(2,4,5-TP or Silvex)

This list does not contain known breakdown products of the listed substances such as Endrin Aldehyde.

- B. The U.S. EPA's list of Priority Pollutants also includes chlorinated hydrocarbon pesticides, including some of which are breakdown products:

PRIORITY POLLUTANT

Pentachlorophenol	Endrin
Aldrin	Endrin Aldehyde
Dieldrin	Heptachlor
Chlordane	Heptachlor Epoxide
4,4-DDT	(Hexachlorocyclohexane - BHC)
4,4-DDE (p,p-DDX)	Alpha BHC
4,4-DDD (p,p-TDE)	Beta BHC
Alpha Endosulfan	Gamma BHC (Lindane)
Beta Endosulfan	Delta BHC
Endosulfan Sulfate	Toxaphene

In a U.S. EPA document titled "*Water-Related Environmental Fate of 129 Priority Pollutants*", Volumes I and II, December 1979, the U.S. EPA compiled the results of studies done on the Priority Pollutants regarding the transforming parameters; chemical speciation, photolysis, oxidation, hydrolysis, volatilization, sorption, bioaccumulation, biotransformation, and biodegradation. For several of the constituents it is possible to estimate the relative persistence in the environment and bioaccumulation tendency. However, some of the studies had contradictory results and/or were inconclusive. In addition for some of the constituents, the various parameters had not been studied.

A U.S. EPA document titled "*National Recommended Water Quality Criteria: 2002, Human Health Criteria Calculation Matrix*", includes Bioconcentration Factors (BCFs) for the Priority Pollutants listed above, ranging between 11 for Pentachlorophenol to 53,600 for DDT.

- C. Early editions of the Basin Plan referenced "Group A Pesticides", which is a reference to "*Water Quality Criteria*" also known as "The Green Book", a Report of the National Technical Advisory Committee to the Secretary of the Interior, April 1, 1968, and published by the Federal Water Pollution Control Administration (predecessor to the U.S. EPA). In The Green Book, Pesticide Group A contains the following list of chemicals that are "acutely toxic at concentrations of 5 µg/l and less":

Organochloride Pesticides

Aldrin	DDT
BHC	Dieldrin
Chlordane	Endosulfan
Endrin	Methoxychlor
Heptachlor	Perthane
Lindane	TDE (DDE)
	Toxaphene

This list does not include breakdown products, nor does it refer to relative persistence. Also contained in The Green Book but not referenced in previous editions of the Basin Plan, is Pesticide Group B, which contains a list of pesticide compounds that are “generally not acutely toxic at levels of 1.0 mg/l or less”. The Pesticide Group B list includes the following chlorinated hydrocarbon pesticides:

2,4-D compounds

2,4,5-T compounds

Again, persistence is not referenced.

- D. The analytical methods used by laboratories to test for pesticides generally apply to groups of chemicals with similarities in chemical structure. A list of Organochlorine Pesticides that could be detected by one method (U.S. EPA Method 8080) includes the following chlorinated hydrocarbon pesticides (it also includes PCBs):

Organochlorine Pesticides

Aldrin	Endosulfan II (beta)
BHCs	Endosulfan Sulfate
Chlordane	Endrin
DDD	Endrin Aldehyde
DDE	Heptachlor
DDT	Heptachlor Epoxide
Dieldrin	Lindane
Endosulfan I (alpha)	Methoxychlor
	Toxaphene

A test for Organohalide Pesticides (U.S. EPA Method 617) includes additional chlorinated hydrocarbon pesticides (and PCBs) as well as pesticides that may contain other halogens (fluorine, bromine, iodine) instead of chlorine. The chlorinated hydrocarbon pesticides on the list include the following:

Organohalide Pesticides

Aldrin	Endrin Aldehyde
BHCs	Heptachlor
Captan	Heptachlor Epoxide
Chlordane	Isodrin (an isomer of Aldrin)
Dichloran	Lindane
Dicofol	Methoxychlor
Dieldrin	Mirex
Endosulfan I	PCNB
Endosulfan II	Perthane
Endosulfan Sulfate	Strobane
Endrin	Toxaphene

Another laboratory analytical method (U.S. EPA Method 8150) tests for Chlorinated Herbicides:

Chlorinated Herbicides

2,4-D	Dicamba
2,4-DB	Dichloroprop
2,4,5-T	Dinoseb
2,4,5,TP (Silvex)	MCPA
Dalapon	MCPD

There are many other chlorinated hydrocarbon pesticides that are not included in any of these lists and a comprehensive list is beyond the scope of the proposed Order. The rates of persistence and bioaccumulation are relative and the research into these parameters is incomplete. For the purposes of the proposed Order the list of persistent chlorinated hydrocarbon pesticides will include but not be limited to the following:

Persistent Chlorinated Hydrocarbon Pesticides

Aldrin	Endosulfan I (Alpha)
Alpha BHC	Endosulfan II (Beta)
Beta BHC	Endosulfan Sulfate
Gamma BHC (Lindane)	Endrin
Delta BHC	Endrin Aldehyde
Captan	Heptachlor
Chlordane	Heptachlor Epoxide
2,4-D	Isodrin (an isomer of Aldrin)
2,4-DB	Kepone (Chlordecone)
2,4-D compounds	MCPA
DDD (TDE)	MCPD
DDE	Methoxychlor
DDT	Mirex
Dalapon	PCNB
Dicamba	Pentachlorophenol
Dichloran	Perthane
Dichloroprop	Strobane
Dicofol	2,4,5-T
Dieldrin	2,4,5,TP (Silvex)
Dinoseb	2,4,5-T compounds
	Toxaphene

Reasonable Potential Analysis

As stated above, the Basin Plan Pesticide Water Quality Objective states “*Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency [U.S. EPA] or the Executive Officer.*”

The effluent monitoring results submitted by the Discharger (see Table 4), reported the detection of several chlorinated hydrocarbon pesticides; 2,4-D, DDE, Dalapon, Dinoseb, Endosulfan I and Endosulfan II, Heptachlor Epoxide, and 2,4,5-TP. 2,4-D was reported by the laboratory to be in two of six samples at estimated concentrations of 0.45 and 0.69 µg/l. DDE was detected in one of five samples

at a concentration of 0.058 µg/l, which also exceeded the CTR Criteria for the protection of Human Health of 0.00059 µg/l. Dalapon was reported by the laboratory to be in two of six samples; one at a concentration of 13 µg/l and the other at an estimated concentration of 1.1 µg/l. Endosulfan I and Endosulfan II were detected in one of five samples at concentrations of 0.10 and 1.2 µg/l, respectively. The concentrations of Endosulfan also exceeded the CTR Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life of 0.056 µg/l as a 4-Day Average and 0.22 µg/l as an Instantaneous Maximum. Heptachlor Epoxide was detected in one of five samples at a concentration of 0.086 µg/l, which also exceeds the CTR Human Health Criterion of 0.0001 µg/l. 2,4,5-TP was reported by the laboratory to be in two of six samples at estimated concentrations of 0.077 and 0.62 µg/l.

Effluent Limitations

The presence of these pesticides in the effluent presents a reasonable potential to exceed the Basin Plan Water Quality Objective for Pesticides. To protect the aquatic beneficial uses of the receiving water, a concentration-based Effluent Limitation for Persistent Chlorinated Hydrocarbon Pesticides, based on the Basin Water Quality Objective for Pesticides, is included in the proposed Order:

Concentration-based Effluent Limitation for Persistent Chlorinated Hydrocarbon Pesticides:

⇒ Not detectable within the accuracy of analytical methods approved by the U.S. EPA or the Executive Officer

Mass-based Effluent Limitations for Persistent Chlorinated Hydrocarbon Pesticides are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f):

Mass-based Effluent Limitations for Persistent Chlorinated Hydrocarbon Pesticides:

⇒ 0.0000 lbs/day as a Monthly Average
⇒ 0.0000 lbs/day as a Daily Maximum

These limitations are protective of the U.S. EPA CTR Criteria for the Protection of Health for DDE and Heptachlor Epoxide and the CTR Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for Endosulfan.

Basin Plan Water Quality Objective for Settleable Solids

Analytically, Total Solids content of wastewater is defined as all matter that remains as a residue upon evaporation at 103 to 105 °C. Settleable Solids are those that will settle to the bottom of a cone-shaped container (called an Imhoff Cone) in a 60-minute period. Settleable Solids, expressed as ml/l, are an approximate measure of the quality of sludge that will be removed in the primary sedimentation process. Total Solids can be further classified as nonfilterable (suspended) or filterable (colloidal and dissolved). Typical composition of untreated domestic wastewater includes concentrations of Settleable Solids, ranging from weak at 5ml/l to strong at 15 ml/l. After treatment Settleable Solids concentrations should be significantly reduced. Measurement of Settleable Solids is constrained by the capability of the Imhoff Cone itself, which cannot measure concentrations below 0.1 ml/l. Consequently, the proposed

Order contains Effluent Limitations for Settleable Solids at 0.1 ml/l as a 30-Day Average and 0.2 ml/l as a Daily Maximum.

Basin Plan Toxicity Water Quality Objective - Survival of Aquatic Organisms

On page III-8.00, the Basin Plan narrative Toxicity Water Quality Objective prohibits the discharge of toxic substances in toxic amounts. *“This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration... The survival of aquatic life in surface waters subjected to a waste discharge... shall not be less than that for the same water body in areas unaffected by the waste discharge... As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay... In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...”*

The proposed Order contains an Effluent Limitation that requires that the survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than 70% for any one bioassay and 90% for the median of three or more consecutive bioassays. The proposed Order and Monitoring and Reporting Program also prescribe chronic toxicity monitoring and reporting protocols.

Basin Plan Toxicity Water Quality Objective - Aluminum, Ammonia, Atrazine, Chlorine Residual, PAEs, and Tributyltin

On page III-8.00, the Basin Plan narrative Toxicity Water Quality Objective prohibits the discharge of toxic substances in toxic amounts. On page IV-17.00, the Basin Plan contains the *Policy for Application of Water Quality Objectives*, which provides that narrative objectives may be translated using numerical limits published by other agencies and organizations. Effluent Limitations for Aluminum, Ammonia, Atrazine, Chlorine Residual, PAEs, and Tributyltin based on the Basin Plan narrative Toxicity Objective are described as follows:

Aluminum

Aluminum can be toxic to aquatic organisms. Based on information submitted by the Discharger, Polyaluminum Hydroxychloride may be used as a coagulant before the wastewater flows to the gravity filters. The use of this coagulant presents a reasonable potential for the discharge of elevated concentrations of Aluminum to cause or contribute to an in-stream excursion above the Basin Plan prohibition against the discharge of toxic constituents in toxic concentrations.

For Aluminum, U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. The recommended Acute or Maximum Concentration (1-Hour Average) for Aluminum is 750 µg/l (micrograms per liter = 10⁻³ g/l) and the Chronic or Continuous Concentration (4-Day Average) is 87 µg/l, (both expressed as total recoverable Aluminum). U.S. EPA recommends that the ambient criteria are protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria.

Effluent monitoring results submitted by the Discharger (see Table 1) indicated the presence of total recoverable Aluminum, in twelve samples, at concentrations of 11.8, 12.8, 25.1, 27.2, 27.4, 28.7, 37.7, 59.0, 61.0, 256, 274, and 404 µg/l. The three highest concentrations were above the Chronic Criteria. New Effluent Limitations for Aluminum have been included in the proposed Order to protect the receiving stream aquatic life beneficial uses based on U.S. EPA's recommended aquatic criteria, and have been established at the Ambient Water Quality Criteria for Aluminum.

The U.S. EPA Technical Support Document for Water Quality-based Toxics Control recommends converting chronic (four-day) and acute (one-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. Equations summarizing the conversion are shown below:

$$AMEL = 2.22[\min(0.163CMC, 0.302CCC)] \quad MDEL = 6.13[\min(0.163CMC, 0.302CCC)]$$

where: AMEL = average monthly effluent limitation

MDEL = maximum daily effluent limitation

CCC = criteria continuous concentration (four-day average)

CMC = criteria maximum concentration (one-hour average)

Concentration-based Effluent Limitations for Aluminum:

⇒ 160 µg/l = 0.160 mg/l as a Daily Average

⇒ 87 µg/l = 0.087 mg/l as a 4-Day Average

⇒ 58 µg/l = 0.058 mg/l as a Monthly Average

Mass-based Effluent Limitations for Aluminum are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Aluminum mass limits are calculated using the concentration-based Effluent Limitations and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitations for Aluminum:

⇒ 0.160 mg/l \times 8.345 \times 2.18 MGD \cong 2.9 lbs/day as a Daily Average

⇒ 0.087 mg/l \times 8.345 \times 2.18 MGD \cong 1.58 lbs/day as a 4-Day Average

⇒ 0.058 mg/l \times 8.345 \times 2.18 MGD \cong 1.1 lbs/day as a Monthly Average

Ammonia

Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts Ammonia to Nitrate, and denitrification is a process that converts Nitrate to Nitrogen Gas, which is then released to the atmosphere. Wastewater treatment plants commonly use nitrification and denitrification processes to remove Ammonia from the waste stream. Inadequate or incomplete nitrification or denitrification may result in the discharge of Ammonia or Nitrate to the receiving stream.

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In water, un-ionized Ammonia (NH_3) exists in equilibrium with the Ammonium ion (NH_4^+). The toxicity of aqueous Ammonia solutions to aquatic organisms is primarily attributable to the un-ionized Ammonia form, with the Ammonium ion being relatively less toxic. Total Ammonia refers to the sum of these two forms in aqueous solutions. Analytical methods are used to directly determine the Total Ammonia concentration, which is then used to calculate the un-ionized Ammonia (toxic) concentration in water.

U.S. EPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life, for Total Ammonia, include acute (1-Hour Average) standards based on pH and chronic (30-Day Average) standards based on pH and temperature. In addition, U.S. EPA specified that the highest 4-Day Average within a 30-Day period shall not exceed 2.5 times the chronic criteria. U.S. EPA found that as pH increased, both the acute and chronic toxicity of Ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of Ammonia is not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. U.S. EPA has presented the Acute Ammonia Criteria in three ways: as equations, in a table, and in graphs that relate pH to Ammonia concentrations. Attachment C shows the Acute Criteria when salmonids are present. The Chronic Criteria have been presented in tables shown in Attachments D and E. The equations used to calculate the Ammonia criteria are shown below and in Attachments C, D, and E:

$$\text{Criteria Maximum Concentration (1-Hour Ave.)} = \text{CMC} = \left(\frac{0.275}{1 + 10^{7.204 - \text{pH}}} + \frac{39.0}{1 + 10^{\text{pH} - 7.204}} \right)$$

$$\begin{aligned} \text{Criteria Continuous Concentration (30-Day Ave.)} &= \text{CCC} \\ \text{CCC} &= \left(\frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right) \times \text{MIN}(2.85, 1.45 \times 10^{0.028 \times (25 - T)}) \end{aligned}$$

$$\begin{aligned} 2.5 \times \text{Criteria Continuous Concentration} &= 2.5 \times \text{CCC} \\ 2.5 \times \text{CCC} &= 2.5 \times \left(\frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right) \times \text{MIN}(2.85, 1.45 \times 10^{0.028 \times (25 - T)}) \end{aligned}$$

The existing Order contains a Receiving Water Limitation for un-ionized Ammonia, that requires that the discharge shall not cause Ammonia in the receiving water to exceed 0.025 mg/l as Nitrogen. The WWTP has had numerous violations of the Receiving Water Limitation. Effluent monitoring results submitted by the Discharger indicate that the concentration of Ammonia in the effluent has exceeded the U.S. EPA Ambient Water Quality Chronic Criteria for Ammonia on numerous occasions.

Concentration-Based Effluent Limitations for Ammonia

The Code of Federal Regulations, 40 CFR 122.44(d)(1)(iii), states that when a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above allowable numeric criteria for an individual pollutant, the NPDES permit must contain an effluent limit. Therefore, the proposed Order contains new Effluent Limitations for Ammonia based on the Ambient Water Quality Criteria represented in Attachments C, D, and E. The Discharger must calculate and report the 1-Hour Average

using Attachment C, the 4-Day Average using Attachment D, and 30-Day Average using Attachment E. The equations to complete the calculations are shown above.

Mass-Based Effluent Limitations for Ammonia

Mass-based Effluent Limitations for Ammonia are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Discharger must calculate the mass limits using the concentration-based Effluent Limits calculated according to Attachments C, D and E, and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$). The calculations will be similar to those shown above, for Aluminum.

Atrazine

For Atrazine, a triazine pesticide (not a chlorinated hydrocarbon), the U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. The recommended Instantaneous Maximum Concentration is $1.0 \text{ } \mu\text{g/l}$ (0.001 mg/l). Monitoring results submitted by the Discharger (see Table 4) indicated the presence of Atrazine in one of five samples, at a concentration of $2.0 \text{ } \mu\text{g/l}$, which is above the Criteria to protect freshwater aquatic life. The Basin Plan prohibits the discharge of toxic substances in toxic amounts. To protect the receiving stream aquatic life beneficial uses, a new concentration-based Effluent Limitation for Atrazine, based on the Ambient Water Quality Criterion, is included in the proposed Order:

Concentration-based Effluent Limitation for Atrazine:

⇒ $1.0 \text{ } \mu\text{g/l}$ as an Instantaneous Maximum

A mass-based Effluent Limitation for Atrazine is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Atrazine mass limit is calculated using the concentration-based Effluent Limitation of $1.0 \text{ } \mu\text{g/l}$ (0.001 mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Atrazine:

⇒ $0.001 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.0182 \text{ lbs/day}$ as a Daily Maximum

Chlorine Residual

Chlorine is commonly used as a disinfection agent in the treatment of wastewater. The Discharger uses Chlorine for disinfection at the WWTP. For dechlorination, the Discharger uses sulfur dioxide, which combines with Chlorine, to render it relatively unreactive and thus remove it from the waste stream. Inadequate dechlorination may result in discharge of Chlorine to the receiving stream and cause toxicity. The Basin Plan prohibits the discharge of toxic substances in toxic amounts. The use of Chlorine as a disinfectant presents a reasonable potential that it could be discharged in toxic concentrations.

Chlorine can cause toxicity to aquatic organisms when discharged to surface waters. For Chlorine, U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. The Recommended Maximum Concentration (1-Hour Average) for Chlorine is 0.019 mg/l and the Chronic

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(4-Day Average) is 0.011 mg/l. Rounded off, the limits are 0.02 mg/l and 0.01 mg/l, respectively. Concentration-based Effluent Limitations for Chlorine Residual, based on these criteria, are included in the Order.

The previous Order contained only an Effluent Limitation for Chlorine Residual of 0.02 mg/l as a Daily Maximum. To be protective of aquatic life beneficial uses, the Effluent Limitations must correspond to the Ambient Water Quality Criteria. Concentration-based Effluent Limitations for Chlorine Residual have been included in the proposed Order to protect the receiving stream aquatic life beneficial uses and have been established at the Ambient Water Quality Criteria for Chlorine. The proposed Order contains the same Daily Maximum Limitation as the existing Order, 0.02 mg/l expressed as a 1-Hour Average, but also contains a new Effluent Limitation of 0.01 mg/l as a 4-Day Average:

Concentration-based Effluent Limitations for Chlorine Residual:

⇒ 0.02 mg/l as a 1-Hour Average (existing)

⇒ 0.01 mg/l as a 4-Day Average (new)

The existing treatment and disinfection system is capable of achieving 0.01 mg/l Chlorine Residual as a 4-Day Average and 0.02 mg/l Chlorine Residual as a 1-Hour Average. Therefore, a compliance schedule has not been included.

Mass-based Effluent Limitations are also included in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Chlorine Residual mass limits are calculated using the concentration-based Effluent Limitations (Acute and Chronic Ambient Water Quality Criteria, 0.02 mg/l and 0.01 mg/l, respectively) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitations for Chlorine Residual:

⇒ $0.02 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.364 \text{ lbs/day}$ as a 1-Hour Average

⇒ $0.01 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.182 \text{ lbs/day}$ as a 4-Day Average

PAEs

Phthalate acid esters (PAEs) represent a large family of chemicals widely used as plasticizers, primarily in the production of polyvinyl chloride (PVC) resins. PVC resins are used in such diverse industries as construction, home furnishings, transportation, apparel, and food and medical packaging materials. Phthalates also have non-plasticizer uses in pesticide carriers, cosmetics, fragrances, munitions, industrial oils, and insect repellants. The most widely used phthalate plasticizer is Bis(2-ethylhexyl)phthalate. Other PAEs include Dioctyl phthalates, Butyl benzyl phthalate (BBP), Diisodecyl phthalate, Dibutyl phthalate (DBP), Diethyl phthalate (DEP), Dimethyl phthalate (DMP), Di-tridecyl phthalate, and n-Hexyl n-decyl phthalate.

In the Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life, U.S. EPA has published Toxicity Information on the Chronic Lowest Observed Effect Level for the sum of the PAEs of 3 µg/l. For Bis(2-ethylhexyl)phthalate, individually, the U.S. EPA CTR Criterion to protect Human

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Health (30-Day average) for Drinking Water Sources (consumption of water and aquatic organisms) is 1.8 µg/l.

In the monitoring results submitted by the Discharger (see Table 3), the laboratory reported the presence of Bis(2-ethylhexyl)phthalate in two of five samples, at estimated concentrations of 1.7 and 2.93 µg/l, Diethyl phthalate in one of five samples, at a concentration of 4.57 µg/l, and Di-n-butyl phthalate in one of five samples, at an estimated concentration of 1.0 µg/l. The Bis(2-ethylhexyl)phthalate concentration of 2.93 µg/l and the Diethyl phthalate concentration of 4.57 µg/l were detected in the same sample. The sum of the two PAEs exceeds the Chronic Lowest Observed Effect Level for PAEs of 3 µg/l. The estimated Bis(2-ethylhexyl)phthalate concentration of 2.93 µg/l also exceeds the CTR Criterion of 1.8 µg/l. Individual Effluent Limitations for Bis(2-ethylhexyl)phthalate are discussed below.

To protect the aquatic habitat beneficial uses of the receiving waters, a new concentration-based Effluent Limitation for the sum of the PAEs, based on the Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life, U.S. EPA Toxicity Information on the Chronic Lowest Observed Effect Level for PAEs of 3 µg/l (as a 30-Day Average), is included in the proposed Order:

Concentration-based Effluent Limitation, for Sum of PAEs:

⇒ 3 µg/l as a Monthly Average

A mass-based Effluent Limitation for the sum of the PAEs is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The mass limit for the sum of the PAEs is calculated using the concentration-based Effluent Limitation of 3 µg/l (0.003 mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Sum of PAEs:

⇒ $0.003 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.055 \text{ lbs/day}$ as a Monthly Average

Tributyltin:

Tributyltin (TBT) is an organometallic compound in which a carbon atom is linked to a tin atom. Tributyltin is primarily used as a biocide in antifouling paints applied to ship hulls to keep barnacles and other organisms from attaching to the hull. TBT remains effective over long periods because it is released slowly into the water column over time.

For Tributyltin, U.S. EPA has developed Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life. The Recommended Maximum Concentration (1-Hour Average) for Tributyltin is 0.46 µg/l and the Chronic (4-Day Average) is 0.072 µg/l.

Monitoring results submitted by the Discharger (see Table 6) indicated the presence of Tributyltin in three of twelve samples, at concentrations of 0.006, 0.008, and 0.066 µg/l. The maximum projected effluent concentration of Tributyltin exceeded the Chronic Criteria (0.072 µg/l). To protect the aquatic

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beneficial uses of the receiving water, concentration-based Effluent Limitations for Tributyltin, based on the Ambient Water Quality Criteria, are included in the proposed Order.

The U.S. EPA Technical Support Document for Water Quality-based Toxics Control recommends converting chronic (four-day) and acute (one-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. Equations summarizing the conversion are shown below:

$$AMEL = 2.87[\min(0.112CMC, 0.193CCC)] \quad MDEL = 8.91[\min(0.112CMC, 0.193CCC)]$$

where: AMEL = average monthly effluent limitation

MDEL = maximum daily effluent limitation

CCC = criteria continuous concentration (four-day average)

CMC = criteria maximum concentration (one-hour average)

Concentration-based Effluent Limitations for Tributyltin:

⇒ 0.12 µg/l as a Daily Average

⇒ 0.063 µg/l as a 4-Day Average

⇒ 0.040 µg/l as a Monthly Average

Mass-based Effluent Limitation for Tributyltin are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The mass limits are calculated using the concentration-based Effluent Limitations of 0.11 µg/l (0.00011 mg/l), 0.063 µg/l (0.000063 mg/l), and 0.035 µg/l (0.000035 mg/l), and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitations for Tributyltin:

⇒ $0.00011 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.0020 \text{ lbs/day}$ as a Daily Average

⇒ $0.000063 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.0011 \text{ lbs/day}$ as a 4-Day Average

⇒ $0.000035 \text{ mg/l} \times 8.345 \times 2.18 \cong 0.00064$ as a Monthly Average

Drinking Water Standards for Alachlor, Nitrate, and Nitrite, and Manganese and MTBE

Section III of the Basin Plan contains Water Quality Objectives. On page III-3.00, the Chemical Constituents states “*Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses...At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in...Title 22 of the California Code of Regulations*”. DHS has adopted Primary MCLs in Title 22 for Alachlor, Nitrate, and Nitrite and Secondary MCLs for Manganese and MTBE. Municipal and domestic supply is a beneficial use of the receiving water. Effluent Limitations for Alachlor, Nitrate, and Nitrite based on the PMCLs, and for Manganese and MTBE based on the SMCLs, are described below:

Alachlor

For Alachlor, the U.S. EPA and subsequently DHS, have developed a PMCL of 2 µg/l. Monitoring results submitted by the Discharger (see Table 4) indicated the presence of Alachlor, an herbicide (not persistent), in one of five samples, at a concentration of 3.2 µg/l, which is above the PMCL. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based Effluent Limitation for Alachlor, based on the PMCL, is included in the proposed Order:

Concentration-based Effluent Limitation for Alachlor:

⇒ 2 µg/l as a Monthly Average

A mass-based Effluent Limitation for Alachlor is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Alachlor mass limit is calculated using the concentration-based Effluent Limitation of 2 µg/l (0.002 mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Alachlor:

⇒ $0.002 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.0364 \text{ lbs/day}$ as a Monthly Average

Nitrate

Untreated domestic wastewater contains Ammonia. Nitrification is a biological process that converts Ammonia to Nitrate, and denitrification is a process that converts Nitrate to Nitrogen Gas, which is then released to the atmosphere. Wastewater treatment plants commonly use nitrification and denitrification processes to remove Ammonia from the waste stream. Inadequate or incomplete nitrification or denitrification may result in the discharge of Ammonia or Nitrate to the receiving stream. The Discharger's WWTP does not include denitrification as a unit process, increasing the probability that Nitrate may be discharged to the receiving stream.

The U.S. EPA and subsequently DHS, have developed a PMCL of 10,000 µg/l (10.0 mg/l) for total Nitrate plus Nitrite (as N). Recent toxicity studies have also indicated a possibility that Nitrate is toxic to aquatic organisms. The conversion of Ammonia to Nitrate presents a reasonable potential for the discharge to exceed the PMCL for Nitrate. Effluent monitoring results submitted by the Discharger (see Table 6) indicated the presence of Nitrate (as N), in twelve samples, at concentrations of 2.7, 6.3, 6.8, 7.0, 7.5, 7.8, 12, 13, 13, 13, 17, and 22 mg/l, and Nitrite (as N) in three of twelve samples at 0.22, 0.28, and 0.37 mg/l. The six highest reported concentrations of Nitrate alone exceeded the PMCL.

The proposed Order includes a new concentration-based Effluent Limitation for total Nitrate plus Nitrite (as N) based on the PMCL, which will be protective of the municipal beneficial use if the receiving stream:

Concentration-based Effluent Limitation for Total Nitrate plus Nitrite (as N):

⇒ 10 mg/l as a Monthly Average

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A mass-based Effluent Limitation for Nitrate is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The total Nitrate plus Nitrite mass limit is calculated using the concentration-based Effluent Limitation of 10 mg/l and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Total Nitrate plus Nitrite (as N):

$\Rightarrow 10 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 182 \text{ lbs/day}$ as a Monthly Average

Nitrite

For Nitrite, the U.S. EPA and subsequently the DHS, have developed a PMCL of 1,000 $\mu\text{g/l}$ (1 mg/l). Effluent monitoring results submitted by the Discharger (see Table 6) indicated the presence of Nitrite, in three of twelve samples, at concentrations of 0.22, 0.28, and 0.37 mg/l.

While none of the concentrations exceeded the PMCL, Regional Board staff conducted a Reasonable Potential analysis as detailed in the U.S. EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD). (The steps of the Reasonable Potential Analysis are outlined below in the discussion for Chloride and the calculation procedures for C_v are shown in the discussions for Chloride and Copper.)

For Nitrite:

1. $n = 12$ and **Highest Value = 0.37 mg/l**
2. $n = 12 \Rightarrow C_v = 1.62$
3. $n = 12$ and $C_v = 1.62 \Rightarrow$ **Multiplication Factor = 8.24** (Table 3-1 of the TSD)
4. $0.37 \text{ mg/l} \times 8.24 = 3.05 \text{ mg/l}$
5. $3.05 \text{ mg/l} > 1 \text{ mg/l} \Rightarrow$ Reasonable Potential exists to exceed the PMCL

The Reasonable Potential Analysis indicated that there is a statistical probability for Nitrite in the effluent to exceed the PMCL. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based Effluent Limitation for Nitrite, based on the PMCL, is included in the proposed Order:

Concentration-based Effluent Limitation for Nitrite:

$\Rightarrow 1 \text{ mg/l}$ as a Monthly Average

A mass-based Effluent Limitation for Nitrite is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Nitrite mass limit is calculated using the concentration-based Effluent Limitation (PMCL of 1 mg/l) and the mass-calculation equation explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

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Mass-based Effluent Limitation for Nitrite:

⇒ $1 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 18.2 \text{ lbs/day}$ as a Monthly Average

Manganese

For Manganese, the U.S. EPA and the California DHS have developed an SMCL of $50 \text{ } \mu\text{g/l}$ (0.050 mg/l). Effluent monitoring results submitted by the Discharger (see Table 1) indicated the presence of total recoverable Manganese, in twelve samples, at concentrations of 14.4, 21.1, 24.6, 26.2, 32.1, 32.9, 33.7, 35.3, 40.0, 43.6, 48.7, and $55.0 \text{ } \mu\text{g/l}$. The highest reported Manganese concentration exceeded the SMCL.

To protect the drinking water beneficial uses of the receiving waters, a new concentration-based Effluent Limitation for Manganese, based on the SMCL, is included in the proposed Order:

Concentration-based Effluent Limitation for Manganese:

⇒ $50 \text{ } \mu\text{g/l}$ as a Monthly Average

A mass-based Effluent Limitation for Manganese is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Manganese mass limit is calculated using the concentration-based Effluent Limitation (SMCL of 0.050 mg/l) and the mass-calculation equation explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Manganese:

⇒ $0.050 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.910 \text{ lbs/day}$ as a Monthly Average

MTBE (Methyl tert Butyl Ether)

For MTBE, DHS has developed an SMCL of $5 \text{ } \mu\text{g/l}$ (0.005 mg/l). Effluent monitoring results submitted by the Discharger (see Table 2) indicated the presence of MTBE (a gasoline additive), in seven of twelve samples, at concentrations of 0.21, 0.22, 0.40, 0.47, 0.81, 1.2, and $3.8 \text{ } \mu\text{g/l}$.

While none of the concentrations exceeded the SMCL, Regional Board staff conducted a Reasonable Potential analysis as detailed in the U.S. EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD). (The steps of the Reasonable Potential Analysis are outlined below in the discussion for Chloride and the calculation procedures for C_v are shown in the discussions for Chloride and Copper.)

For MTBE:

1. $n = 12$ and **Highest Value = $3.8 \text{ } \mu\text{g/l}$**
2. $n = 12 \Rightarrow C_v = 1.51$
3. $n = 12$ and $C_v = 1.51 \Rightarrow$ **Multiplication Factor = 7.56** (Table 3-1 of the TSD)

$$4. \quad 3.8 \mu\text{g/l} \times 7.56 = 28.73 \mu\text{g/l}$$

$$5. \quad 28.73 \mu\text{g/l} > 5 \mu\text{g/l} \Rightarrow \text{Reasonable Potential exists to exceed the SMCL}$$

The Reasonable Potential Analysis indicated that there is a statistical probability for MTBE in the effluent to exceed the SMCL. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based Effluent Limitation for MTBE, based on the SMCL, is included in the proposed Order:

Concentration-based Effluent Limitation for MTBE:

\Rightarrow 5 $\mu\text{g/l}$ as a Monthly Average

A mass-based Effluent Limitation for MTBE is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The MTBE mass limit is calculated using the concentration-based Effluent Limitation (SMCL of 0.005 mg/l) and the mass-calculation equation explained and shown above in the introduction to Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for MTBE:

\Rightarrow 0.005 mg/l \times 8.345 \times 2.18 MGD \cong 0.091 lbs/day as a Monthly Average

CTR Criteria for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc

NTR AND CTR

The U.S. EPA adopted the NTR and the CTR that contain numerical water quality standards for many wastewater constituents. Additional explanation of the NTR and CTR is provided in Findings above. The SIP, adopted by the State Water Resources Control Board, contains guidance on implementation of the NTR and the CTR. These Rules contain water quality standards applicable to this discharge. Effluent Limitations for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc based on the NTR and CTR are described below.

DEVELOPMENT OF INTERIM LIMITATIONS

Section 2.1 of the SIP provides that: *“Based on an existing discharger’s request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit.”* Section 2.1 states further that compliance schedules may be included in NPDES permits provided that the following justification has been submitted: *“(a) documentation that diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream; (b) documentation of source control measures and/or pollution minimization efforts currently underway or completed; (c) a proposal for additional or future source control measures, pollutant minimization actions, or waste treatment (i.e., facility upgrades); and (d) a demonstration that the proposed schedule is as short as practicable.”* The proposed Order requires the Discharger to provide this information. If justification for compliance schedules is **not** completed and submitted by

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the Discharger to the Regional Board, or the Regional Board determines that the justification is not adequate, the new water quality based Effluent Limitations for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc become effective on **1 September 2004**. If compliance schedules are justified and implemented, then the final water quality based effluent limitations for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc become effective **30 January 2009**. The proposed Order contains a Provision with a compliance schedule for implementation of effluent limitations for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc.

If compliance schedules are granted for implementation of final Effluent Limitations for CTR and NTR constituents, Section 2.2.1 of the SIP requires the Regional Board to establish interim limitations and compliance dates in the NPDES permit. Discharge of constituents in concentrations in excess of the final Effluent Limitations, but in compliance with interim Effluent Limitations, can significantly degrade water quality and adversely impact the beneficial uses of the receiving stream on a long-term basis. For example, regarding Copper, U.S. EPA states, in the Ambient Water Quality Criteria for the Protection of Fresh Water Aquatic Life, that an unstressed system will take approximately three years to recover from a pollutant in which exposure to Copper exceeds the recommended criterion. However, the interim Effluent Limitations establish enforceable ceiling concentrations until compliance with the final Effluent Limitations can be achieved.

The SIP requires that interim limitations must: 1) be based on current treatment plant performance or existing permit limitations, whichever is more stringent; 2) include interim compliance dates separated by no more than one year; and 3) be included in the Provisions. There are no limitations for CTR and NTR constituents in the existing Order. Therefore, the interim limitations in the proposed Order are based on the current treatment plant performance.

To develop interim Effluent Limitations:

- Procedures for deriving water quality-based limits are outlined in U.S. EPA's *Technical Support Document for Water Quality Based Toxics Control*, EPA/505/2-90-001 (TSD). Table 5-2 of the TSD contains multipliers to be used in establishing maximum daily limits based on a long-term average objective and the Coefficient of Variation (C_V) for the data set.
- When there are ten or more sampling data points, the variability in sampling and the laboratory is accounted for by establishing interim Effluent Limitations based on normally distributed data, where 99.9% of the data points lie within 3.3 standard deviations from the mean (*Basic Statistical Methods for Engineers and Scientists*, Kennedy and Neville, Harper and Row). In this case, once the C_V is calculated, the appropriate multiplier can be selected from Table 5.2. Where actual sampling shows an

exceedance of the proposed 3.3 standard deviation based interim Effluent Limitation, the maximum detected concentration is established as the interim Effluent Limitation.

- The TSD acknowledges that a minimum of ten data points is necessary to conduct a statistical analysis based on normally distributed data. When less than ten data points are available, the TSD recommends use of a C_v of 0.6 to represent wastewater effluent sampling. In this case, the long-term average objective is to maintain, at a minimum, the current performance level of the treatment plant. With $C_v = 0.6$ and with a 99th Percentile occurrence probability, Table 5.2 provides a multiplier of 3.11.
- The interim Effluent Limitation is established by multiplying the maximum concentration of the observed sample points by the appropriate multiplier.

The Discharger can undertake source control and treatment plant operational measures to maintain compliance with the interim limitations included in the proposed Order. The proposed Order contains a Provision with interim compliance dates, and interim Effluent Limitations based on the current treatment plant performance, for Bis(2-ethylhexyl)phthalate, Bromodichloromethane, Copper, Dioxins and Furans, Lead, PCBs, Silver, and Zinc.

Bis(2-ethylhexyl)phthalate (also known as Di(2-ethylhexyl)phthalate)

For Bis(2-ethylhexyl)phthalate, the CTR Criterion to protect Human Health (30-Day average) for Drinking Water Sources (consumption of water and aquatic organisms) is 1.8 µg/l. Effluent monitoring results submitted by the Discharger (see Table 3) indicated detectable concentrations of Bis(2-ethylhexyl)phthalate, in two of five samples. The concentrations were estimated by the analyzing laboratory to be 1.7 and 2.93 µg/l. The highest estimated concentration of Bis(2-ethylhexyl)phthalate in the effluent exceeded the CTR criterion. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based final Effluent Limitation for Bis(2-ethylhexyl)phthalate, based on the CTR Criterion, is included in the proposed Order:

Final Concentration-based Effluent Limitation for Bis(2-ethylhexyl)phthalate:

⇒ 1.8 µg/l as a Monthly Average

Mass-based final Effluent Limitations for Bis(2-ethylhexyl)phthalate are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Bis(2-ethylhexyl)phthalate mass limit is calculated using the concentration-based Effluent Limitation of 1.8 µg/l (0.0018 mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitation for Bis(2-ethylhexyl)phthalate:

⇒ 0.0018 mg/l \times 8.345 \times 2.18 MGD \cong 0.0327 lbs/day as a Monthly Average

If a compliance schedule is granted for implementation of the final Effluent Limitations for Bis(2-ethylhexyl)phthalate, then an interim Daily Maximum Effluent Limitation for

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Bis(2-ethylhexyl)phthalate is calculated using the procedure outlined above in the introduction for this Section:

$$n = 5 \text{ and Highest Value} = 2.93 \mu\text{g/l}$$

$$n < 10 \Rightarrow C_v = 0.6$$

$$C_v = 0.6 \Rightarrow \text{Multiplication Factor} = 3.11 \text{ (Table 5-2 of the TSD)}$$

Interim Effluent Limitation for Bis(2-ethylhexyl)phthalate:

$$\Rightarrow 2.93 \mu\text{g/l} \times 3.11 = \underline{9.11 \mu\text{g/l, as a Daily Maximum}}$$

Calculation procedures for C_v are shown in the discussions for Chloride and Copper.

Bromodichloromethane

The CTR Criterion for Bromodichloromethane to protect Human Health (30-Day average) for Drinking Water Sources (consumption of water and aquatic organisms) is $0.56 \mu\text{g/l}$. Effluent monitoring results submitted by the Discharger (see Table 2), contained concentrations of Bromodichloromethane, in ten of twelve samples, at 0.50, 0.60, 0.61, 0.63, 0.64, 0.66, 0.69, 0.71, 1.2, and $1.5 \mu\text{g/l}$. Nine of the reported concentrations exceed the CTR criterion for Bromodichloromethane. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based final Effluent Limitation for Bromodichloromethane, based on the CTR Criterion, is included in the proposed Order:

Final Concentration-based Effluent Limitation for Bromodichloromethane:

$$\Rightarrow 0.56 \mu\text{g/l as a Monthly Average}$$

Bromodichloromethane, Bromoform, Chloroform, and Dibromochloromethane are collectively known as Total Trihalomethanes. U.S. EPA has established a PMCL for Total Trihalomethanes of $80 \mu\text{g/l}$. Bromodichloromethane, Chloroform, and Dibromochloromethane were detected in the effluent from SMD1. Bromoform was not detected. The sums of the concentrations of Bromodichloromethane, Chloroform, and Dibromochloromethane do not exceed the PMCL and had no reasonable potential to do so. The Effluent Limitations for Chloroform and Bromodichloromethane are protective of the drinking water beneficial uses and below the PMCL. Chloroform was detected at concentrations that exceeded OEHHA Criteria and is discussed below. The concentration of Dibromochloromethane did not exceed the water quality criteria, therefore, effluent limitations for Dibromochloromethane are not proposed.

A mass-based Effluent Limitation for Bromodichloromethane (final Effluent Limitation) is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Bromodichloromethane mass limit is calculated using the concentration-based Effluent Limitation of $0.56 \mu\text{g/l}$ (0.00056 mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitation for Bromodichloromethane:

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$$\Rightarrow 0.00056 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.0102 \text{ lbs/day as a Monthly Average}$$

If a compliance schedule is granted for implementation of the final Effluent Limitations for Bromodichloromethane, then an interim Daily Maximum Effluent Limitation for Bromodichloromethane is calculated using the procedure outlined above in the introduction to this Section:

$$n = 12 \text{ and Highest Value} = 1.5 \text{ } \mu\text{g/l}$$

$$n = 12 \Rightarrow C_v = 0.72$$

$$C_v = 0.72 \Rightarrow \text{Multiplication Factor} = 3.65 \text{ (Table 5-2 of the TSD)}$$

Interim Effluent Limitation for Bromodichloromethane:

$$\Rightarrow 1.5 \text{ } \mu\text{g/l} \times 3.65 = \underline{5.48 \text{ } \mu\text{g/l, as a Daily Maximum}}$$

Calculation procedures for C_v are shown in the discussions for Chloride and Copper.

Copper

The toxicity of Copper to aquatic life varies with hardness. As hardness concentrations decrease, the toxicity of Copper to aquatic life increases. The CTR Copper Criteria for the Protection of Freshwater Aquatic Life are hardness-dependent and may be represented in tabular or graphic form, or by equations. The Copper Criteria (expressed as dissolved metal) are presented as both Chronic or Continuous Concentrations (CCC or 4-Day Average) and Acute or Maximum Concentrations (CMC or 1-Hour Average). The CTR contains conversion factors that translate the total recoverable metal fraction to the dissolved fraction. The conversion factor, for both the Acute and Chronic Copper Criteria is: $CF = 0.96$. The equations to calculate the Copper Criteria (expressed as the dissolved fraction and including the conversion factor) are:

$$\text{Criteria Continuous Concentration (4-Day Ave.)} = CCC = (e^{(0.8545[\ln(\text{hardness})] - 1.702)}) \times (0.960)$$

$$\text{Criteria Maximum Concentration (1-Hour Ave.)} = CMC = (e^{(0.9422[\ln(\text{hardness})] - 1.700)}) \times (0.960)$$

The equations to calculate the Copper Criteria (expressed as total recoverable fraction) are:

$$\text{Criteria Continuous Concentration (4-Day Ave.)} = CCC = (e^{(0.8545[\ln(\text{hardness})] - 1.702)})$$

$$\text{Criteria Maximum Concentration (1-Hour Ave.)} = CMC = (e^{(0.9422[\ln(\text{hardness})] - 1.700)})$$

Effluent monitoring data submitted by the Discharger (see Table 1) contained concentrations of dissolved Copper in twelve samples, at 0.82, 0.88, 1.08, 1.18, 1.48, 1.49, 1.87, 1.90, 1.96, 2.11, 2.47,

and 2.57 µg/l, and concentrations of total recoverable Copper, in twelve samples, at 0.88, 0.92, 1.07, 1.49, 1.52, 1.52, 1.78, 1.97, 2.05, 2.22, 2.68, and 2.93 µg/l.

Reasonable Potential Analysis for copper

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the effluent hardness of 61 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Copper fraction) are calculated to be 5.9 µg/l and 8.4 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Copper fraction) are calculated to be 6.1 µg/l and 8.8 µg/l. None of the Copper concentrations exceeded the Criteria calculated with an effluent hardness of 61 mg/l; therefore, the hardness and Copper concentrations in the effluent alone do not create toxic conditions.

However, the Discharger also submitted hardness data, for Rock Creek upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, *“When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...”* The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Copper fraction) are calculated to be 2.3 µg/l and 2.9 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Copper fraction) are calculated to be 2.4 µg/l and 3.1 µg/l. With a receiving water hardness of 20 mg/l, the two highest reported concentrations of Copper (dissolved fraction) exceed the Chronic Criteria (2.3 µg/l) and the two highest reported concentrations of Copper (total recoverable fraction) exceed the Chronic Criteria (2.4 µg/l), presenting a reasonable potential to cause, or contribute to an in-stream excursion above the CTR Criteria for Copper. Effluent Limitations are necessary.

Final Concentration-Based Effluent Limitations for copper

When assessing reasonable potential to cause or contribute to an in-stream excursion above water quality criteria, the upstream hardness of Rock Creek represents worst-case conditions. However, according to guidance from the SWRCB, Effluent Limitations based on upstream hardness are overprotective, while the protection provided by Effluent Limits based on the hardness of the effluent is not certain. According to guidance from the SWRCB, use of the downstream hardness to establish Effluent Limitations is protective of beneficial uses. Therefore, to protect the aquatic habitat beneficial uses of the receiving waters, new concentration-based final Effluent Limitations for Copper, based on the CTR Criteria and the hardness of the combined flow of Rock Creek and the effluent (Monitoring Point R2), are included in the proposed Order.

While the Copper Criteria are presented as dissolved concentrations, Effluent Limitations must be expressed as the total recoverable fraction of Copper. (The conversion factor for Copper is discussed above.) Therefore, the calculations to determine the Copper Effluent Limitations were restricted to the data expressed as total recoverable Copper.

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In addition, the NPDES regulations, at 40 CFR 122.45(d) and reiterated in the SIP for CTR constituents, require that all permit limits be expressed, unless impracticable, as both average monthly and average weekly values for Publicly Owned Treatment Works (POTWs). In lieu of the average weekly limits for POTWs, U.S. EPA recommends establishing maximum daily effluent limits. Water quality criteria, which are not expressed as average monthly and maximum daily limits, must be converted. The Effluent Limitation conversion process is outlined in Section 1.4B of the SIP, and is shown below for Copper:

Step 1: Identify applicable water quality criteria, C:

- Chronic Criteria for Copper = C_{chronic} = CCC (Criteria Continuous Concentration)
- Acute Criteria for Copper = C_{acute} = CMC (Criteria Maximum Concentration)

Step 2: For each criterion, calculate the Effluent Concentration Allowance (ECA):

- $ECA = C + D(C - B)$ when $C > B$, and
- $ECA = C$ when $C \leq B$, and/or $D = 0$

Where: B = ambient background concentration
 D = dilution credit

For Copper, $D = 0$, therefore

$$\Rightarrow ECA = C$$

$$\Rightarrow ECA_{\text{chronic}} = C_{\text{chronic}} = CCC = e^{\{0.8545[\ln(\text{hardness})] - 1.702\}}$$

$$\Rightarrow ECA_{\text{acute}} = C_{\text{acute}} = CMC = e^{\{0.9422[\ln(\text{hardness})] - 1.700\}}$$

Step 3: For each ECA, determine each Long-Term Average discharge condition (LTA):

- $LTA_{\text{chronic}} = ECA_{\text{chronic}} \times ECA_{\text{chronic multiplier 99}}$
 $= CCC \times ECA_{\text{chronic multiplier 99}}$
- $LTA_{\text{acute}} = ECA_{\text{acute}} \times ECA_{\text{acute multiplier 99}}$
 $= CMC \times ECA_{\text{acute multiplier 99}}$

Where: $ECA_{\text{chronic multiplier 99}}$ and $ECA_{\text{acute multiplier 99}}$ are from Table 1 of the SIP, or calculated as follows:

$$ECA_{\text{chronic multiplier 99}} = e^{\{0.5\sigma_4^2 - z\sigma_4\}}$$

$$= e^{\{0.5[\ln(Cv^2/4 + 1)] - 2.326\sqrt{\ln(Cv^2/4 + 1)}\}}$$

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$$\begin{aligned} ECA_{\text{acute multiplier 99}} &= e^{\{0.5\sigma^2 - z\sigma\}} \\ &= e^{\{0.5[\ln(C_v^2 + 1)] - 2.326\sqrt{\ln(C_v^2 + 1)}\}} \end{aligned}$$

$$\begin{aligned} \text{Where: } \sigma &= \text{Standard Deviation} = \sqrt{\ln(C_v^2 + 1)} \\ \sigma^2 &= \ln(C_v^2 + 1) \\ \sigma_4 &= \sqrt{\ln(C_v^2/4 + 1)} \\ \sigma_4^2 &= \ln(C_v^2/4 + 1) \\ z &= 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis} \end{aligned}$$

- For Total Recoverable Copper:
 (Coefficient of Variation calculation shown below *),
 $\Rightarrow C_v = 0.37$

$$\begin{aligned} ECA_{\text{chronic multiplier 99}} &= e^{\{0.5[\ln((0.37)^2/4 + 1)] - 2.326\sqrt{\ln((0.37)^2/4 + 1)}\}} \\ &= e^{\{0.5[\ln((0.1369)/4 + 1)] - 2.326\sqrt{\ln((0.1369)/4 + 1)}\}} \\ &= e^{\{0.5[\ln(0.0342 + 1)] - 2.326\sqrt{\ln(0.0342 + 1)}\}} \\ &= e^{\{0.5[\ln(1.0342)] - 2.326\sqrt{\ln(1.0342)}\}} \\ &= e^{\{0.5(0.0337) - 2.326\sqrt{0.0337}\}} \\ &= e^{\{0.0168 - 2.326(0.1834)\}} \\ &= e^{(0.0168 - 0.4267)} \\ &= e^{(-0.4099)} \\ &= 0.664 \end{aligned}$$

$$\begin{aligned} ECA_{\text{acute multiplier 99}} &= e^{\{0.5[\ln((0.37)^2 + 1)] - 2.326\sqrt{\ln((0.37)^2 + 1)}\}} \\ &= e^{\{0.5[\ln(0.1369 + 1)] - 2.326\sqrt{\ln(0.1369 + 1)}\}} \\ &= e^{\{0.5[\ln(1.1369)] - 2.326\sqrt{\ln(1.1369)}\}} \\ &= e^{\{0.5(0.1283) - 2.326\sqrt{0.1283}\}} \\ &= e^{\{0.0642 - 2.326(0.3582)\}} \\ &= e^{(0.0642 - 0.8332)} \\ &= e^{(-0.7690)} \\ &= 0.463 \end{aligned}$$

$$\begin{aligned} \Rightarrow LTA_{\text{chronic}} &= CCC \times ECA_{\text{chronic multiplier 99}} \\ &= CCC \times 0.664 \end{aligned}$$

$$= 0.664CCC$$

$$\begin{aligned}\Rightarrow LTA_{acute} &= CMC \times ECA_{acute \text{ multiplier } 99} \\ &= CMC \times 0.463 \\ &= 0.463CMC\end{aligned}$$

Step 4: Select the lowest LTAs from *Step 3*:

$$\Rightarrow LTA_{min} = \min(0.664CCC, 0.463CMC)$$

For Total Recoverable Copper

$$\begin{aligned}\Rightarrow CCC &= e^{\{0.8545[\ln(\text{hardness})] - 1.702\}} \\ \Rightarrow CMC &= e^{\{0.9422[\ln(\text{hardness})] - 1.700\}}\end{aligned}$$

Step 5: Calculate water quality based Effluent Limitations; an Average Monthly Effluent Limitation (AMEL) and a Maximum Daily Effluent Limitation (MDEL):

$$\begin{aligned}\Rightarrow AMEL &= LTA_{min} \times AMEL_{\text{multiplier } 95} \\ \Rightarrow MDEL &= LTA_{min} \times MDEL_{\text{multiplier } 99}\end{aligned}$$

Where: $AMEL_{\text{multiplier } 95}$ and $MDEL_{\text{multiplier } 99}$ are from Table 2 of the SIP, or calculated as follows:

$$\begin{aligned}AMEL_{\text{multiplier } 95} &= e^{\{z\sigma_n - 0.5\sigma_n^2\}} \\ &= e^{\{z\sqrt{\ln(C_v^2/n + 1)} - 0.5[\ln(C_v^2/n + 1)]\}}\end{aligned}$$

Where: $\sigma_n = \sqrt{\ln(C_v^2/n + 1)}$
 $\sigma_n^2 = \ln(C_v^2/n + 1)$
 $z = 1.645$ for 95th percentile probability basis
 n = number of samples per month (If the sampling frequency is four times a month or less, $\therefore n = 4$)

$$\begin{aligned}MDEL_{\text{multiplier } 99} &= e^{\{z\sigma - 0.5\sigma^2\}} \\ &= e^{\{z\sqrt{\ln(C_v^2 + 1)} - 0.5[\ln(C_v^2 + 1)]\}}\end{aligned}$$

Where: $\sigma = \sqrt{\ln(C_v^2 + 1)}$
 $\sigma^2 = \ln(C_v^2 + 1)$
 $z = 2.326$ for 99th percentile probability basis

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- For Total Recoverable Copper:

($C_V = 0.37$, $n = 4$, and $Z_{95\text{th Percentile}} = 1.645$, $Z_{99\text{th Percentile}} = 2.326$)

$$\begin{aligned}
 AMEL_{\text{multiplier } 95} &= e^{\{Z_{95}\sqrt{\ln(C_V^2/n + 1)} - 0.5[\ln(C_V^2/n + 1)]\}} \\
 &= e^{\{(1.645)\sqrt{\ln((0.37)^2/4 + 1)} - 0.5[\ln((0.37)^2/4 + 1)]\}} \\
 &= e^{\{(1.645)\sqrt{\ln(0.1369/4 + 1)} - 0.5[\ln(0.1369/4 + 1)]\}} \\
 &= e^{\{(1.645)\sqrt{\ln(0.0342 + 1)} - 0.5[\ln(0.0342 + 1)]\}} \\
 &= e^{\{(1.645)\sqrt{\ln(1.0342)} - 0.5[\ln(1.0342)]\}} \\
 &= e^{\{(1.645)\sqrt{0.0337} - 0.5(0.0337)\}} \\
 &= e^{\{(1.645)(0.1834) - 0.0168\}} \\
 &= e^{(0.3018 - 0.0168)} \\
 &= e^{0.2850}
 \end{aligned}$$

$$AMEL_{\text{multiplier } 95} = 1.33$$

$$\begin{aligned}
 MDEL_{\text{multiplier } 99} &= e^{\{Z_{99}\sqrt{\ln(C_V^2 + 1)} - 0.5[\ln(C_V^2 + 1)]\}} \\
 &= e^{\{(2.326)\sqrt{\ln((0.37)^2 + 1)} - 0.5[\ln((0.37)^2 + 1)]\}} \\
 &= e^{\{(2.326)\sqrt{\ln(0.1369 + 1)} - 0.5[\ln(0.1369 + 1)]\}} \\
 &= e^{\{(2.326)\sqrt{\ln(1.1369)} - 0.5[\ln(1.1369)]\}} \\
 &= e^{\{(2.326)\sqrt{0.1283} - 0.5(0.1283)\}} \\
 &= e^{\{(2.326)(0.3582) - 0.0642\}} \\
 &= e^{(0.8332 - 0.0642)} \\
 &= e^{(0.7690)}
 \end{aligned}$$

$$MDEL_{\text{multiplier } 99} = 2.16$$

- $AMEL = LTA_{\min} \times AMEL_{\text{multiplier } 95}$

$$AMEL = LTA_{\min} \times 1.33$$

$$AMEL = 1.33(LTA_{\min})$$

$$AMEL = 1.33[\min(0.664CCC, 0.463CMC)]$$

- $MDEL = LTA_{\min} \times MDEL_{\text{multiplier } 99}$

$$MDEL = LTA_{\min} \times 2.16$$

$$MDEL = 2.16(LTA_{\min})$$

$$MDEL = 2.16[\min(0.664CCC, 0.463CMC)]$$

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SUMMARY: For Total Recoverable Copper:

- AMEL = $1.33[\min(0.664CCC, 0.463CMC)]$
- MDEL = $2.16[\min(0.664CCC, 0.463CMC)]$

Where:

- $CCC = e^{\{0.8545[\ln(\text{hardness})] - 1.702\}}$
- $CMC = e^{\{0.9422[\ln(\text{hardness})] - 1.700\}}$

* Calculation of C_v for Total Recoverable Copper Data:

Note: If the number of effluent data points is less than ten, or at least 80% of the data are reported as not detected, the C_v shall be set equal to 0.6. If an effluent data point is below the detection limit for the constituent in that sample, one-half of the detection limit shall be used as a value in the calculations.

Y	f	fY	$y = Y - \bar{Y} $	y^2	fy^2
0.88	1	0.88	0.87	0.7569	0.7569
0.92	1	0.92	0.83	0.6889	0.6889
1.07	1	1.07	0.68	0.4624	0.4624
1.49	1	1.49	0.26	0.0676	0.0676
1.52	2	3.04	0.23	0.0529	0.1058
1.78	1	1.78	0.03	0.0009	0.0009
1.97	1	1.97	0.22	0.0484	0.0484
2.05	1	2.05	0.30	0.0900	0.0900
2.22	1	2.22	0.47	0.2209	0.2209
2.68	1	2.68	0.93	0.8649	0.8649
2.93	1	2.93	1.18	1.3924	1.3924
<i>Totals</i>	$\Sigma f = 12$	$\Sigma fY = 21.03$			$\Sigma fy^2 = 4.6991$

Copper Concentration ($\mu\text{g/l}$) = Y

Frequency = f

Number of Samples = n = $\Sigma f = 12$

Mean = $\bar{Y} = \frac{\Sigma fY}{n} = \frac{21.03}{12} = 1.75$

Standard Deviation = $S = \sqrt{\frac{\Sigma fy^2}{n-1}} = \sqrt{\frac{4.6991}{11}} = \sqrt{0.4272} = 0.6536$

Coefficient of Variation = $C_v = \frac{S}{\bar{Y}} = \frac{0.6536}{1.75} = 0.37$

$$\bar{Y} = 1.75$$

Concentration-Based Final Effluent Limitations for copper

The Table and equations shown in Attachment F represent the Acute and Chronic hardness-dependent Copper Criteria as Total Recoverable Copper. The Discharger must calculate the final Effluent Limitations for Acute and Chronic Copper concentrations using the Table shown in Attachment F and/or the equations shown above and in Attachment F, and the effluent Copper and R2 hardness data collected according to the attached Monitoring and Reporting Program.

For Total Recoverable Copper:

- AMEL = $1.33[\min(0.664CCC, 0.463CMC)]$
- MDEL = $2.16[\min(0.664CCC, 0.463CMC)]$

Where:

- CCC = $e^{\{0.8545[\ln(\text{hardness})] - 1.702\}}$
- CMC = $e^{\{0.9422[\ln(\text{hardness})] - 1.700\}}$

Mass-Based Final Effluent Limitations for Copper

Mass-based final Effluent Limitations for Copper, in lbs/day, are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Discharger must calculate the mass limits using the concentration-based Effluent Limits calculated as described above and according to Attachment F, and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$). The calculations will be similar to those shown above, for Aluminum.

Interim Effluent Limitations for Copper

If a compliance schedule is granted for implementation of the final Effluent Limitations for Copper, then the interim Daily Maximum Effluent Limitation for Copper may be calculated using the procedure outlined above in the introduction to this Section:

$$n = 12 \text{ and Highest Value} = 2.93 \mu\text{g/l (Total Recoverable Copper)}$$

$$n = 12 \Rightarrow C_v = 0.37$$

$$C_v = 0.37 \Rightarrow \text{Multiplication Factor} = 2.16 \text{ (Table 5-2 of the TSD, 99}^{\text{th}} \text{ Percentile)}$$

Interim Effluent Limitation for Copper:

$$\Rightarrow 2.93 \mu\text{g/l} \times 2.16 = 6.33 \mu\text{g/l as a Daily Maximum}$$

Dioxins and Furans

The toxic effects of 2,3,7,8-TCDD (Tetrachlorodibenzo-p-dioxin) commonly known as Dioxin, have been well documented. The many congeners (variations) of the Chlorinated Dibenzodioxins (Dioxins)

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and Chlorinated Dibenzofurans (Furans) exhibit toxic effects similar to those of 2,3,7,8-TCDD. The U.S. EPA has published Toxic Equivalency Factors (TEFs) for 17 of the congeners. The TEFs express the relative toxicities of the congeners compared to 2,3,7,8-TCDD, which has a TEF equal to 1.0:

Toxic Equivalency Factors (TEFs) for 2,3,7,8-TCDD Equivalents

Congener	TEF
2,3,7,8-TCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1
1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

For the Dioxins and Furans listed above, the CTR Criterion to protect Human Health (30-Day Average) for Drinking Water Sources (consumption of water and aquatic organisms) is 0.000000013 µg/l (1.3×10^{-8} µg/l or 1.3×10^{-14} g/l). The criterion applies to the sum of the concentrations of 2,3,7,8-TCDD plus each of the congeners, after translation with the respective TEFs.

The Discharger collected five samples and had them analyzed for 2,3,7,8-TCDD and the congeners. Effluent monitoring results submitted by the Discharger (see Table 5) contained a concentration of 2,3,7,8-TCDD in one of the five samples at 3.33 pg/l (3.33×10^{-12} g/l or 3.33×10^{-6} µg/l where pg/l = picograms/liter = 10^{-12} g/l and 10^{-6} µg/l).

Two of the Dioxin and Furan congeners, OCDD (Octa Chlorinated Dibenzodioxin) and OCDF (Octa Chlorinated Dibenzofuran), were also detected in the effluent from SMD1. OCDD was detected in three of the five samples; after translation, the concentrations of OCDD were 0.000979, 0.00102, and 0.00228 pg/l (9.79×10^{-16} , 1.02×10^{-15} , and 2.28×10^{-15} g/l). OCDF was detected in one of the five samples; after translation, OCDF was reported at a concentration of 0.000951 pg/l (9.51×10^{-16} g/l). The OCDD concentration of 0.00228 pg/l and OCDF concentration of 0.000951 pg/l were detected in the same sample.

The sample with the reported concentration of 2,3,7,8-TCDD (3.33×10^{-12} g/l), which was also the sum of the congeners in that sample, exceeds the CTR criterion (1.3×10^{-14} g/l). The sums of the concentrations of OCDD and OCDF in the other samples did not exceed the criterion. To protect the drinking water beneficial uses of the receiving waters, a new concentration-based final Effluent Limitation for Dioxins and Furans, based on the CTR Criterion, is included in the proposed Order:

Final Concentration-based Effluent Limitation for Dioxins and Furans:

⇒ 1.3×10^{-8} µg/l as a Monthly Average

Mass-based final Effluent Limitations for Dioxins and Furans are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The mass limit for the Dioxins and Furans is calculated using the concentration-based Effluent Limitation of 1.3×10^{-8} µg/l (1.3×10^{-11} mg/l) and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitation for Dioxins and Furans:

⇒ $1.3 \times 10^{-11} \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 2.36 \times 10^{-10} \text{ lbs/day}$ as a Monthly Average

If a compliance schedule is granted for implementation of the final Effluent Limitations for Dioxins and Furans, then an interim Daily Maximum Effluent Limitation for Dioxins and Furans is calculated using the procedure outlined above in the introduction to this Section:

$n = 5$ and **Highest Value** = **3.33 pg/l** (3.33×10^{-6} µg/l)

$n < 10 \Rightarrow C_V = 0.6$

$C_V = 0.6 \Rightarrow \text{Multiplication Factor} = 3.11$ (Table 5-2 of the TSD)

Interim Effluent Limitation for Dioxins and Furans:

⇒ $3.33 \text{ pg/l} \times 3.11 = 10.36 \text{ pg/l}$ (10.36×10^{-6} µg/l) as a Daily Maximum

Lead

The toxicity of Lead to aquatic life varies with hardness. As hardness concentrations decrease, the toxicity of Lead to aquatic life increases. The CTR Lead Criteria for the Protection of Freshwater Aquatic Life are hardness-dependent and may be represented in tabular or graphic form, or by equations. The Lead Criteria (expressed as dissolved metal) are presented as both Chronic or Continuous Concentrations (CCC or 4-Day Average) and Acute or Maximum Concentrations (CMC or 1-Hour Average). The CTR contains conversion factors that translate the total recoverable metal fraction to the dissolved fraction. The conversion factor, for both the Acute and Chronic Lead Criteria is: $CF = 1.46203 - \{[\ln(\text{hardness})](0.145712)\}$. The equations to calculate the Lead Criteria (expressed as the dissolved fraction and including the conversion factor) are:

$$CCC = (e^{(1.273[\ln(\text{hardness})] - 4.705)}) \times (1.46203 - \{[\ln(\text{hardness})](0.145712)\})$$

$$CMC = (e^{1.273[\ln(\text{hardness})] - 1.460}) \times (1.46203 - \{[\ln(\text{hardness})](0.145712)\})$$

The equations to calculate the Lead Criteria (expressed as total recoverable fraction) are:

$$CCC = (e^{1.273[\ln(\text{hardness})] - 4.705})$$

$$CMC = (e^{1.273[\ln(\text{hardness})] - 1.460})$$

Effluent monitoring data submitted by the Discharger (see Table 1) contained concentrations of dissolved Lead, in twelve samples, at 0.041, 0.368, 0.424, 0.513, 0.558, 0.567, 0.591, 0.750, 0.926, 1.008, 1.21, and 1.51 µg/l, and concentrations of total recoverable Lead, in twelve samples, at 0.130, 0.387, 0.430, 0.539, 0.549, 0.585, 0.602, 0.772, 0.996, 1.046, 1.260, and 1.490 µg/l.

Reasonable Potential Analysis for Lead

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the effluent hardness of 61 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Lead fraction) are calculated to be 1.46 µg/l and 37.56 µg/l, respectively. The highest reported dissolved Lead concentration **exceeded** the Chronic Criterion for dissolved Lead. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Lead fraction) are calculated to be 1.70 µg/l and 43.52 µg/l. None of the total recoverable Lead concentrations exceeded the Lead Criteria calculated with a hardness of 61 mg/l. However, the highest reported dissolved Lead concentration exceeded the Acute Criterion for dissolved Lead, presenting a reasonable potential to cause, or contribute to an in-stream excursion above the CTR Criteria for Lead.

In addition, the Discharger submitted hardness data for Rock Creek, upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, *“When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...”* The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Lead fraction) are calculated to be 0.42 µg/l and 10.79 µg/l, respectively. The ten highest reported dissolved Lead concentrations **exceeded** the Chronic Criterion. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Lead fraction) are calculated to be 0.41 µg/l and 10.52 µg/l, respectively. The ten highest reported total recoverable Lead concentrations **exceeded** the Chronic Criterion. With a receiving water hardness of 20 mg/l, the majority of the reported concentrations of dissolved and total recoverable Lead exceeded the Chronic Criteria, presenting a reasonable potential to cause, or contribute to an in-stream excursion above the CTR Criteria for Lead. Effluent Limitations are necessary.

Final Concentration-Based Effluent Limitations for lead

When assessing reasonable potential to cause or contribute to an in-stream excursion above water quality criteria, the upstream hardness of Rock Creek represents worst-case conditions. However, according to guidance from the SWRCB, Effluent Limitations based on upstream hardness are overprotective, while the protection provided by Effluent Limits based on the hardness of the effluent is not certain. According to guidance from the SWRCB, use of the downstream hardness to establish Effluent Limitations is protective of beneficial uses. Therefore, to protect the aquatic habitat beneficial uses of the receiving waters, new concentration-based final Effluent Limitations for Lead, based on the CTR Criteria and the hardness of the combined flow of Rock Creek and the effluent (Monitoring Point R2), are included in the proposed Order.

Concentration-Based Final Effluent Limitations for lead

While the Lead Criteria are presented as dissolved concentrations, Effluent Limitations must be expressed as the total recoverable fraction of Lead. (The conversion factor for Lead is discussed above.) Therefore, the calculations to determine the Lead Effluent Limitations were restricted to the data expressed as total recoverable Lead.

In addition, the NPDES regulations at 40 CFR 122.45(d) require that all permit limits be expressed, unless impracticable, as both average monthly and average weekly values for Publicly Owned Treatment Works (POTWs). In lieu of the average weekly limits for POTWs, U.S. EPA recommends establishing maximum daily effluent limits. Water quality criteria, which are not expressed as average monthly and maximum daily limits, must be converted. The Effluent Limitation conversion process is outlined in Section 1.4B of the SIP, the complete calculation process is shown above for Copper, and the results of the calculations for the Lead Effluent Limitations are summarized below:

For Total Recoverable Lead:

- $AMEL = 1.49[\min(0.559CCC, 0.350CMC)]$
- $MDEL = 2.85[\min(0.559CCC, 0.350CMC)]$

Where:

- $CCC = e^{\{1.273[\ln(\text{hardness})] - 4.705\}}$
- $CMC = e^{\{1.273[\ln(\text{hardness})] - 1.460\}}$

The Table and equations shown in Attachment G represent the Acute and Chronic hardness-dependent Lead Criteria as Total Recoverable Lead. The Discharger must calculate the final Effluent Limitations for Acute and Chronic Lead concentrations using the Table shown in Attachment G and/or the equations shown above and in Attachment G, and the effluent Lead and R2 hardness data collected according to the attached Monitoring and Reporting Program.

Mass-Based Final Effluent Limitations for Lead

Mass-based final Effluent Limitations for Lead, in lbs/day, are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Discharger must calculate the mass limits using the concentration-based Effluent Limits calculated using the equations shown above and according to Attachment G, and the mass-calculation equations explained and shown above in

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Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$). The calculations will be similar to those shown above, for Aluminum.

Interim Effluent Limitations for Lead

If a compliance schedule is granted for implementation of the final Effluent Limitations for Lead, then an interim Daily Maximum Effluent Limitation for Lead may be calculated using the procedure outlined above in the introduction to this Section:

$$n = 12 \quad \text{and} \quad \text{Highest Value} = 1.49 \text{ } \mu\text{g/l} \text{ (Total Recoverable Lead)}$$

$$n = 12 \Rightarrow C_v = 0.54$$

$$C_v = 0.54 \Rightarrow \text{Multiplication Factor} = 2.85 \text{ (Table 5-2 of the TSD, 99}^{\text{th}} \text{ Percentile)}$$

Interim Effluent Limitation for Lead:

$$\Rightarrow 1.49 \text{ } \mu\text{g/l} \times 2.85 = 4.25 \text{ } \mu\text{g/l} \text{ as a Daily Maximum}$$

PCBs (Polychlorinated Biphenyls)

PCBs are the chlorinated derivatives of a class of aromatic organic compounds called biphenyls (two joined benzene rings) and were manufactured by the direct chlorination of the biphenyl ring system. Commercial PCBs were complex mixtures of chemical isomers that differed in the amount of chlorination of the biphenyl ring structure. PCBs were marketed in four mixtures containing 21%, 41%, 42%, and 54% chlorine for use in closed electrical systems under the registered trademark Aroclor. PCBs are no longer manufactured in the United States. At one time, PCB mixtures of up to 68% chlorine were used for other applications, including plasticizers, heat transfer fluids, hydraulic fluids, fluids in vacuum pumps and compressors, lubricants, and wax extenders. Because each component of the mixtures differs slightly in its physical, chemical, and biological properties, and because a possible 209 isomers exist, the evaluation of the potential impact of the various mixtures on the environment is complicated.

PCBs are considered to be inert to almost all of the typical chemical reactions and do not undergo oxidation, reduction, addition, elimination, or electrophilic substitution reactions except under extreme conditions. Therefore, PCBs are extremely long-lived and widely disseminated in the environment. In aquatic environments, PCBs are associated with sediments and are usually found at much higher concentrations in sediments than in water. The solubility of PCBs in water is very low, decreasing as the percent chlorination is increased. PCBs are strongly adsorbed to solid surfaces including glass, metal, soils, sediments, and particulates in the environment. PCBs are highly lipophilic (adsorbed by fatty tissues in living organisms) and bioconcentrate to high concentrations in the tissues and in food webs. Relatively low concentrations of PCBs in water can result in relatively high concentrations of PCBs in tissues. PCBs have caused profound toxic effects particularly with repeated exposure. Routes of PCB exposure include ingestion of water and food, inhalation, and dermal contact. The skin, liver, gastrointestinal tract, and nervous system are sites of PCB pathology.

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The CTR Criterion for PCBs to protect Human Health (30-Day average) for Drinking Water Sources (consumption of water and aquatic organisms) is 0.00017 µg/l and applies to the sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260. The CTR Criterion for the Protection of Freshwater Aquatic Life, Continuous Concentration (4-Day Average) is 0.014 µg/l and applies to each Aroclor, individually.

Effluent monitoring results submitted by the Discharger (see Table 4) contained concentrations of three PCB mixtures marketed as Aroclor 1016, Aroclor 1221, and Aroclor 1260, in two of five samples. Aroclor 1016 was estimated by the laboratory to be present at a concentration of 0.26 µg/l, Aroclor 1221 was detected at a concentration of 5.7 µg/l, and Aroclor 1260 was reported by the laboratory to be present at a concentration of 0.078 µg/l. Aroclors 1016 and 1260 were reported in the same sample. All three concentrations exceed both the CTR Human Health and Aquatic Life Criteria. The concentration of 5.7 µg/l was the highest sum of the Aroclors detected.

The detection of Aroclor 1221 and estimated concentrations of Aroclors 1016 and 1260 represent a reasonable potential to cause or contribute to an in-stream excursion above the CTR Criteria for PCBs, individually, and in total.

To protect the drinking water beneficial use of the receiving waters, a new concentration-based final Effluent Limitation for the sum of all the Aroclors based on the CTR Criterion, is included in the proposed Order:

Final Concentration-based Effluent Limitation, Sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260:

⇒ 0.00017 µg/l as a Monthly Average

To protect the habitat beneficial uses of the receiving waters, new concentration-based final Effluent Limitations for the individual PCBs, Aroclor 1016, Aroclor 1221, and Aroclor 1260, based on the CTR Criterion, are also included in the proposed Order. The NPDES regulations at 40 CFR 122.45(d) require that all permit limits be expressed, unless impracticable, as both average monthly and average weekly values for Publicly Owned Treatment Works (POTWs). In lieu of the average weekly limits for POTWs, U.S. EPA recommends establishing maximum daily effluent limits. Water quality criteria, which are not expressed as average monthly and maximum daily limits, must be converted. The Effluent Limitation conversion process is outlined in Section 1.4B of the SIP, the complete calculation process is shown above for Copper, and the results of the calculations for the individual PCB Aroclor Effluent Limitations are summarized below:

Final Concentration-based Effluent Limitations for each PCB; Aroclor 1016, Aroclor 1221, and Aroclor 1260:

$$\begin{aligned} \text{➤ AMEL} &= \text{Average Monthly Effluent Limitation} \\ &= LTA_{\min} \times AMEL_{\text{multiplier } 95} \\ &= LTA_{\text{chronic}} \times AMEL_{\text{multiplier } 95} \\ &= CCC \times ECA_{\text{chronic multiplier } 99} \times AMEL_{\text{multiplier } 95} \end{aligned}$$

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$$= (0.014 \mu\text{g/l}) \times (0.527) \times (1.55) \\ = 0.0114 \mu\text{g/l}$$

➤ MDEL = Maximum Daily Effluent Limitation

$$= LTA_{\min} \times MDEL_{\text{multiplier } 99} \\ = LTA_{\text{chronic}} \times MDEL_{\text{multiplier } 99} \\ = CCC \times ECA_{\text{chronic multiplier } 99} \times MDEL_{\text{multiplier } 99} \\ = (0.014 \mu\text{g/l}) \times (0.527) \times (3.11) \\ = 0.0230 \mu\text{g/l}$$

Mass-based final Effluent Limitations for the sum of the Aroclors and also for the individual PCBs, Aroclor 1016, Aroclor 1221, and Aroclor 1260, are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The PCB mass limits are calculated using the concentration-based Effluent Limitations of $0.00017 \mu\text{g/l}$ (0.00000017 mg/l) for the sum of the Aroclors, the AMEL of $0.0114 \mu\text{g/l}$ (0.0000114 mg/l) and MDEL of $0.0230 \mu\text{g/l}$ (0.0000230 mg/l) for the individual Aroclors, and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Final Mass-based Effluent Limitation for the Sum of the Aroclors:

$$\Rightarrow 0.00000017 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.00000309 \text{ lbs/day as a Monthly Average}$$

Final Mass-based Effluent Limitation for Individual Aroclors 1016, 1221, and 1260:

$$\Rightarrow 0.0000114 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.000207 \text{ lbs/day as a Monthly Average}$$

$$\Rightarrow 0.0000203 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.000369 \text{ lbs/day as a Daily Maximum}$$

If a compliance schedule is granted for implementation of the final Effluent Limitations for the sum of the Aroclors and the individual Aroclors 1016, 1221, and 1260, then interim Daily Maximum Effluent Limitations for the sum of the Aroclors and the individual Aroclors 1016, 1221, and 1260 are calculated using the procedure outlined above in the introduction to this Section:

For the sum of the Aroclors and Aroclor 1221;

$$n = 5 \text{ and Highest Value} = 5.7 \mu\text{g/l}$$

$$n < 10 \Rightarrow C_v = 0.6$$

$$C_v = 0.6 \Rightarrow \text{Multiplication Factor} = 3.11 \text{ (Table 5-2 of the TSD)}$$

Interim Effluent Limitations for the sum of the Aroclors:

$$\Rightarrow 5.7 \mu\text{g/l} \times 3.11 = 17.73 \mu\text{g/l as a Daily Maximum}$$

Interim Effluent Limitations for Aroclor 1221:

$$\Rightarrow 5.7 \mu\text{g/l} \times 3.11 = 17.73 \mu\text{g/l as a Daily Maximum}$$

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For Aroclor 1016;

$$n = 5 \text{ and Highest Value} = 0.26 \mu\text{g/l}$$

$$n < 10 \Rightarrow C_V = 0.6$$

$$C_V = 0.6 \Rightarrow \text{Multiplication Factor} = 3.11 \text{ (Table 5-2 of the TSD)}$$

Interim Effluent Limitations for Aroclor 1016:

$$\Rightarrow 0.26 \mu\text{g/l} \times 3.11 = 0.81 \mu\text{g/l} \text{ as a Daily Maximum}$$

For Aroclor 1260

$$n = 5 \text{ and Highest Value} = 0.078 \mu\text{g/l}$$

$$n < 10 \Rightarrow C_V = 0.6$$

$$C_V = 0.6 \Rightarrow \text{Multiplication Factor} = 3.11 \text{ (Table 5-2 of the TSD)}$$

Interim Effluent Limitation for Aroclor 1260:

$$\Rightarrow 0.078 \mu\text{g/l} \times 3.11 = 0.24 \mu\text{g/l} \text{ as a Daily Maximum}$$

Calculation procedures for C_V are shown in the discussions for Chloride and Copper.

Silver

The toxicity of Silver to aquatic life varies with hardness. As hardness concentrations decrease, the toxicity of Silver to aquatic life increases. The CTR Silver Criteria for the Protection of Freshwater Aquatic Life are hardness-dependent and may be represented in tabular or graphic form, or by an equation. The Silver Criteria (expressed as dissolved metal) are presented as Acute or Instantaneous Maximum Concentrations (CMC or 1-Hour Average) with no Chronic Criteria. The CTR contains a conversion factor to translate the total recoverable metal fraction to the dissolved fraction. The conversion factor, for the Silver Criteria is: $CF = 0.85$. The equation to calculate the Silver Criteria (expressed as the dissolved fraction and including the conversion factor) is:

$$\text{Criteria Maximum Concentration (1-Hour Ave.)} = \text{CMC} = \left(e^{\{1.72[\ln(\text{hardness})] - 6.52\}} \right) \times (0.850)$$

The equation to calculate the Silver Criteria (expressed as total recoverable fraction) is:

$$\text{Criteria Maximum Concentration (1-Hour Ave.)} = \text{CMC} = \left(e^{\{1.72[\ln(\text{hardness})] - 6.52\}} \right)$$

Effluent monitoring data submitted by the Discharger (see Table 1) contained concentrations of dissolved Silver, in five of twelve samples, at 0.002, 0.005, 0.017, 0.025, and 0.110 $\mu\text{g/l}$, and total recoverable Silver, in ten of twelve samples, at 0.020, 0.025, 0.027, 0.033, 0.034, 0.045, 0.065, 0.077, 0.095, and 0.431 $\mu\text{g/l}$.

Reasonable Potential Analysis for silver

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the effluent hardness of 61 mg/l and the appropriate equations shown above, the Acute Criterion (expressed as the dissolved Silver fraction) is calculated to be 1.5 µg/l. Similarly, the Acute Criterion (expressed as the total recoverable Copper fraction) is calculated to be 1.7 µg/l. None of the Silver concentrations exceeded the Criteria calculated using the effluent hardness of 61 mg/l; therefore, the hardness and Copper concentrations in the effluent alone do not create toxic conditions.

However, the Discharger also submitted hardness data, for Rock Creek upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, *“When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...”* The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the equations shown above, the Acute Criterion (expressed as the dissolved Silver fraction) is calculated to be 0.22 µg/l. Similarly, the Acute Criterion (expressed as the total recoverable Silver fraction) is calculated to be 0.25 µg/l. With a receiving water hardness of 20 mg/l, the highest reported concentration of Silver (total recoverable fraction) exceeds the Acute Criterion (0.25 µg/l), presenting a reasonable potential to cause, or contribute to an in-stream excursion above the CTR Criteria for Silver. Effluent Limitations are necessary.

Final Concentration-Based Effluent Limitations for silver

When assessing reasonable potential to cause or contribute to an in-stream excursion above water quality criteria, the upstream hardness of Rock Creek represents worst-case conditions. However, according to guidance from the SWRCB, Effluent Limitations based on upstream hardness are overprotective, while the protection provided by Effluent Limits based on the hardness of the effluent is not certain. According to guidance from the SWRCB, use of the downstream hardness to establish Effluent Limitations is protective of beneficial uses. Therefore, to protect the aquatic habitat beneficial uses of the receiving waters, new concentration-based final Effluent Limitations for Silver, based on the CTR Criteria and the hardness of the combined flow of Rock Creek and the effluent (Monitoring Point R2), are included in the proposed Order.

Concentration-Based Final Effluent Limitations for Silver

While the Silver Criteria are presented as dissolved concentrations, Effluent Limitations must be expressed as the total recoverable fraction of Silver. (The conversion factor for Silver is discussed above.) Therefore, the calculations to determine the Silver Effluent Limitations were restricted to the data expressed as total recoverable Silver.

In addition, the NPDES regulations at 40 CFR 122.45(d) requires that all permit limits be expressed, unless impracticable, as both average monthly and average weekly values for Publicly Owned Treatment Works (POTWs). In lieu of the average weekly limits for POTWs, U.S. EPA recommends establishing maximum daily effluent limits. Water quality criteria, which are not expressed as average monthly and

maximum daily limits, must be converted. The Effluent Limitation conversion process is outlined in Section 1.4B of the SIP, the complete calculation process is shown above for Copper, and the results of the calculations for the Silver Effluent Limitations are summarized below:

For Total Recoverable Silver:

- AMEL = 2.48(0.137CMC)
- MDEL = 7.29(0.137CMC)

Where:

- $CMC = e^{\{1.72[\ln(\text{hardness})] - 6.52\}}$

The Table and equations shown in Attachment H represent the Instantaneous Maximum hardness-dependent Silver Criteria as Total Recoverable Silver. The Discharger must calculate the final Effluent Limitations for Instantaneous Maximum Silver concentrations using the Table shown in Attachment H and/or the equations shown above and in Attachment H, and the effluent Silver and R2 hardness data collected according to the attached Monitoring and Reporting Program.

Mass-Based Final Effluent Limitations for Silver

Mass-based final Effluent Limitations for Silver, in lbs/day, are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Discharger must calculate the mass limits using the concentration-based Effluent Limits calculated using the equations shown above and according to Attachment H, and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$). The calculations will be similar to those shown above, for Aluminum.

Interim Effluent Limitations for Silver

If a compliance schedule is granted for implementation of the final Effluent Limitations for Silver, then an interim Daily Maximum Effluent Limitation for Silver may be calculated using the procedure outlined above in the introduction to this Section:

$$n = 12 \quad \text{and} \quad \text{Highest Value} = 0.431 \text{ } \mu\text{g/l} \text{ (Total Recoverable Silver)}$$

$$n = 12 \Rightarrow C_v = 1.6$$

$$C_v = 1.6 \Rightarrow \text{Multiplication Factor} = 7.29 \text{ (Table 5-2 of the TSD, 99}^{\text{th}} \text{ Percentile)}$$

Interim Effluent Limitation for Silver:

$$\Rightarrow 0.431 \text{ } \mu\text{g/l} \times 7.29 = 3.14 \text{ } \mu\text{g/l} \text{ as a Daily Maximum}$$

Calculation procedures for C_v are shown in the discussions for Chloride and Copper.

Zinc

The toxicity of Zinc to aquatic life varies with hardness. As hardness concentrations decrease, the toxicity of Zinc to aquatic life increases. The CTR Zinc Criteria for the Protection of Freshwater Aquatic Life are hardness-dependent and may be represented in tabular or graphic form, or by equations. The Zinc Criteria (expressed as dissolved metal) are presented as both Chronic or Continuous Concentrations (CCC or 4-Day Average) and Acute or Maximum Concentrations (CMC or 1-Hour Average). The CTR contains conversion factors that translate the total recoverable metal fraction to the dissolved fraction. The conversion factor, for the Acute Zinc Criteria is: $CF = 0.978$. The conversion factor, for the Chronic Zinc Criteria is: $CF = 0.986$. The equations to calculate the Zinc Criteria (expressed as the dissolved fraction and including the conversion factor) are:

$$CCC = (e^{(0.8473[\ln(\text{hardness})] + 0.884)}) \times (0.986)$$

$$CMC = (e^{(0.8473[\ln(\text{hardness})] + 0.884)}) \times (0.978)$$

The equation to calculate both Lead Criteria (expressed as total recoverable fraction) is:

$$CCC = CMC = (e^{(0.8473[\ln(\text{hardness})] + 0.884)})$$

Effluent monitoring data submitted by the Discharger (see Table 1) contained concentrations of dissolved Zinc, in twelve samples, at 6.16, 25.2, 25.5, 26.4, 27.3, 27.8, 28.5, 28.8, 31.7, 33.5, 34.4, and 72.2 µg/l, and total recoverable Zinc, in twelve samples, at 7.40, 21.8, 26.2, 26.5, 26.8, 27.8, 28.7, 28.7, 29.2, 32.7, 33.6, and 34.5 µg/l.

Reasonable Potential Analysis for zinc

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the effluent hardness of 61 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Zinc fraction) are calculated to be 78 µg/l and 77 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Zinc fraction) are calculated to be 79 µg/l and 77 µg/l. None of the Zinc concentrations exceeded the Zinc Criteria calculated with an effluent hardness of 61 mg/l; therefore, the hardness and Zinc concentrations in the effluent alone do not create toxic conditions.

However, the Discharger also submitted hardness data for Rock Creek, upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, “*When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...*” The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Zinc fraction) are calculated to be 30 µg/l and 30 µg/l, respectively. The four highest reported dissolved Zinc concentrations **exceeded** the Acute and Chronic Criteria. Similarly,

the Chronic and Acute Criteria (expressed as the total recoverable Zinc fraction) are calculated to be 31 µg/l and 30 µg/l, respectively. The three highest reported total recoverable Zinc concentrations **exceeded** the Acute and Chronic Criteria. With a receiving water hardness of 20 mg/l, several of the reported concentrations of dissolved and total recoverable Zinc exceeded the Acute and Chronic Criteria, presenting a reasonable potential to cause, or contribute to an in-stream excursion above the CTR Criteria for Zinc. Effluent Limitations are necessary.

Final Concentration-Based Effluent Limitations for zinc

When assessing reasonable potential to cause or contribute to an in-stream excursion above water quality criteria, the upstream hardness of Rock Creek represents worst-case conditions. However, according to guidance from the SWRCB, Effluent Limitations based on upstream hardness are overprotective, while the protection provided by Effluent Limits based on the hardness of the effluent is not certain. According to guidance from the SWRCB, use of the downstream hardness to establish Effluent Limitations is protective of beneficial uses. Therefore, to protect the aquatic habitat beneficial uses of the receiving waters, new concentration-based final Effluent Limitations for Zinc, based on the CTR Criteria and the hardness of the combined flow of Rock Creek and the effluent (Monitoring Point R2), are included in the proposed Order.

Concentration-Based Final Effluent Limitations for Zinc

While the Zinc Criteria are presented as dissolved concentrations, Effluent Limitations must be expressed as the total recoverable fraction of Zinc. (The conversion factor for Zinc is discussed above.) Therefore, the calculations to determine the Zinc Effluent Limitations were restricted to the data expressed as total recoverable Zinc.

In addition, the NPDES regulations at 40 CFR 122.45(d) requires that all permit limits be expressed, unless impracticable, as both average monthly and average weekly values for Publicly Owned Treatment Works (POTWs). In lieu of the average weekly limits for POTWs, U.S. EPA recommends establishing maximum daily effluent limits. Water quality criteria, which are not expressed as average monthly and maximum daily limits, must be converted. The Effluent Limitation conversion process is outlined in Section 1.4B of the SIP, the complete calculation process is shown above for Copper, and the results of the calculations for the Zinc Effluent Limitations are summarized below:

For Total Recoverable Zinc:

- AMEL = $1.23[\min(0.746\text{CCC}, 0.570\text{CMC})]$
- MDEL = $1.75[\min(0.746\text{CCC}, 0.570\text{CMC})]$

Where:

- $\text{CCC} = \text{CMC} = (e^{\{0.8473[\ln(\text{hardness})] + 0.884\}})$

The Table and equations shown in Attachment I represent the Acute and Chronic hardness-dependent Lead Criteria as Total Recoverable Zinc. The Discharger must calculate the final Effluent Limitations for Acute and Chronic Zinc concentrations using the Table shown in Attachment I and/or the equation

shown above and in Attachment I, and the effluent Zinc and R2 hardness data collected according to the attached Monitoring and Reporting Program.

Mass-Based Final Effluent Limitations for Zinc

Mass-based final Effluent Limitations for Zinc, in lbs/day, are also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Discharger must calculate the mass limits using the concentration-based Effluent Limits calculated using the equations shown above and according to Attachment I, and the mass-calculation equations explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$). The calculations will be similar to those shown above, for Aluminum.

Interim Effluent Limitations for Zinc

If a compliance schedule is granted for implementation of the final Effluent Limitations for Zinc, then an interim Daily Maximum Effluent Limitation for Zinc may be calculated using the procedure outlined above in the introduction to this Section:

$$n = 12 \quad \text{and} \quad \text{Highest Value} = 34.5 \text{ } \mu\text{g/l} \text{ (Total Recoverable Zinc)}$$

$$n = 12 \Rightarrow C_v = 0.26$$

$$C_v = 0.26 \Rightarrow \text{Multiplication Factor} = 1.76 \text{ (Table 5-2 of the TSD, 99}^{\text{th}} \text{ Percentile)}$$

Interim Effluent Limitation for Zinc:

$$\Rightarrow 34.5 \text{ } \mu\text{g/l} \times 1.76 = 60.72 \text{ } \mu\text{g/l} \text{ as a Daily Maximum}$$

Calculation procedures for C_v are shown in the discussions for Chloride and Copper.

Other Drinking Water Criteria for Chloroform

Municipal and domestic supply is a beneficial use of the receiving stream. The narrative toxicity objective and this beneficial use designation comprise a water quality standard applicable to pollutants in the receiving stream. On page IV-17.00, the Basin Plan contains the *Policy for Application of Water Quality Objectives*, which provides that narrative objectives may be translated using numerical limits published by other agencies and organizations.

Effluent monitoring results submitted by the Discharger (see Table 2) indicated the presence of Chloroform, in eleven of twelve samples, at concentrations of 3.5, 5.6, 5.8, 5.9, 6.5, 8.0, 8.4, 9.2, 9.7, 11, and again at 11 $\mu\text{g/l}$.

The California EPA Office of Environmental Health Hazard Assessment (OEHHA) has published the Toxicity Criteria Database, which contains cancer potency factors for chemicals, including Chloroform, that have been used as a basis for regulatory actions by the boards, departments and offices within California EPA. The OEHHA cancer potency value for oral exposure to Chloroform is 0.031 milligrams per kilogram body weight per day (mg/kg-day). By applying standard toxicological

assumptions used by OEHHA and U.S. EPA in evaluating health risks via drinking water exposure of 70 kg body weight and 2 liters per day water consumption, this cancer potency factor is equivalent to a concentration in drinking water of 1.1 µg/l (0.0011 mg/l) at the 1-in-a-million cancer risk level. This risk level is consistent with that used by the Department of Health Services (DHS) to set *de minimis* risks from involuntary exposure to carcinogens in drinking water in developing MCLs and Action Levels and by OEHHA to set negligible cancer risks in developing Public Health Goals for drinking water.

The one-in-a-million cancer risk level is also mandated by U.S. EPA in applying human health protective criteria contained in the National Toxics Rule and the California Toxics Rule to priority toxic pollutants in California surface waters. Based on information included in analytical laboratory results submitted by the Discharger, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the water quality standard for Chloroform. Therefore, an Effluent Limitation for Chloroform is included in the proposed Order and is based on the Basin Plan toxicity objective and OEHHA Toxicity Criteria for the protection of human health:

Concentration-based Effluent Limitation for Chloroform:

⇒ 1.1 µg/l as a Monthly Average

A mass-based Effluent Limitation for Chloroform is also included in the proposed Order in accordance with the Code of Federal Regulations, 40 CFR 122.45(f). The Chloroform mass limit is calculated using the concentration-based Effluent Limitation (0.0011 µg/l) and the mass-calculation equation explained and shown above in Section XVI ($X \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} = Y \text{ lbs/day}$).

Mass-based Effluent Limitation for Chloroform:

⇒ $0.0011 \text{ mg/l} \times 8.345 \times 2.18 \text{ MGD} \cong 0.020 \text{ lbs/day}$ as a Monthly Average

Bromodichloromethane, Bromoform, Chloroform, and Dibromochloromethane are collectively known as Total Trihalomethanes. U.S. EPA has established a PMCL for Total Trihalomethanes of 80 µg/l (the sum of the concentrations of the four constituents). Bromodichloromethane, Chloroform, and Dibromochloromethane were detected in the effluent from SMD1. Bromoform was not detected. The sums of the concentrations of Bromodichloromethane, Chloroform, and Dibromochloromethane do not exceed the PMCL. Individual Effluent Limitations for Chloroform and Bromodichloromethane in the proposed Order are protective of the drinking water beneficial uses and below the PMCL. Bromodichloromethane was detected at concentrations that exceeded CTR Criteria, and is discussed above. The concentration of Dibromochloromethane did not exceed water quality criteria and no effluent limitations are proposed for Dibromochloromethane.

Receiving Water Limitations

The Clean Water Act, Section 303(a-c), required states to adopt numeric criteria where they are necessary to protect designated uses. The Regional Board adopted numeric criteria in the Basin Plan. The Basin Plan is a regulatory reference for meeting the state and federal requirements for water quality

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control (40 CFR 131.20). State Board Resolution No. 68-16, the Antidegradation Policy, does not allow changes in water quality less than that prescribed in Water Quality Control Plans (Basin Plans). The Basin Plan states that; "The numerical and narrative water quality objectives define the least stringent standards that the Regional Board will apply to regional waters in order to protect the beneficial uses." The proposed Order contains Receiving Water Limitations based on the Basin Plan numerical and narrative water quality objectives for Biostimulatory Substances, Chemical Constituents, Color, Dissolved Oxygen, Floating Material, Oil and Grease, pH, Pesticides, Radioactivity, Salinity, Sediment, Settleable Material, Suspended Material, Tastes and Odors, Temperature, Toxicity and Turbidity.

Revised Receiving Water Limitations – DO, pH, Temperature, and Turbidity

Receiving Water Limitations are based on Basin Plan Water Quality Objectives. The discharge does have a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan narrative Water Quality Objectives for Dissolved Oxygen (DO), pH, Temperature, and Turbidity. The existing Order contains Receiving Water Limitations that are not in conformance with the Basin Plan and/or not protective of the beneficial uses of the receiving water. The proposed Order contains Receiving Water Limitations for DO, pH, Temperature, and Turbidity that have been modified as described below:

Dissolved Oxygen (DO)

Existing Order No. 97-113 has a DO Receiving Water Limitation of 5 mg/l, which is the Basin Plan Water Quality Objective for warm-water fisheries. However, the Basin Plan contains a 7 mg/l DO Water Quality Objective for cold-water fisheries and for waters designated as suitable for spawning habitat. As discussed above, the beneficial uses of Rock Creek, Dry Creek, and Coon Creek include cold water and spawning beneficial uses. Therefore, the proposed Order contains a Receiving Water Limitation of 7 mg/l for DO.

pH

Existing Order No. 97-113 has a pH Receiving Water Limitation that applies a 30-Day averaging period to the ambient pH, as follows:

"9. The 30-day average ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units."

The proposed Order contains a Receiving Water Limitation in which the 30-day averaging period is applied only to the change in pH, as follows:

"2. The ambient pH to fall below 6.5 or exceed 8.5, or the 30-day average ambient pH to change by more than 0.5 units."

The Receiving Water Limitation in the proposed Order is more protective of beneficial uses and in conformance with the Basin Plan Water Quality Objective for pH, "The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5..."

Temperature

Existing Order No. 97-113 has a temperature Receiving Water Limitation that applies a 30-day averaging period to the ambient temperature, as follows:

“11. The 30-day average ambient temperature to increase more than 5°F.”

The proposed Order contains a Receiving Water Limitation that has no averaging period for temperature, as follows:

“3. The ambient temperature to increase more than 5°F.”

The Receiving Water Limitation in the proposed Order is more protective of beneficial uses and in conformance with the Basin Plan Water Quality Objective for temperature *“At no time or place shall temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature. In determining compliance with the water quality objectives for temperature, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.”*

The Discharger has not demonstrated that an averaging period for temperature is protective of beneficial uses.

Turbidity

Existing Order No. 97-113 contains the following Receiving Water Limitation:

“8. The 30-day average for turbidity to increase as follows:

- a. More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.*
- b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.*
- c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.*
- d. More than 10 percent where natural turbidity is greater than 100 NTUs.”*

The proposed Order contains the following Receiving Water Limitation:

“4. The turbidity to increase as follows:

- a. (The 30-day average turbidity to increase) More than 1 Nephelometric Turbidity Units (NTUs) where natural turbidity is between 0 and 5 NTUs.*
- b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.*
- c. More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.*

d. More than 10 percent where natural turbidity is greater than 100 NTUs."

The Receiving Water Limitation has been changed so that the 30-day average applies only to part a. and no longer applies to parts b., c., and d. A tertiary plant is able to meet the limitations in parts b., c., and d. without an averaging period. However, a tertiary plant is not able to meet the limitations of part a. without an averaging period. Therefore, the 30-day averaging period is only applied to part a. During high storm flows and inflow to the plant, the wastewater discharged from the plant will be more dilute and less turbid. In addition, during high storm flows, the Receiving Water will have a higher relative turbidity. Therefore, the Turbidity Effluent Limitations in the proposed Order are protective of the Receiving Water Beneficial Uses.

CONSTITUENTS WITH NO LIMITATIONS

Agriculture Irrigation Objectives/Study - EC and TDS

As described above, agriculture irrigation is a beneficial use of the receiving waters, Rock Creek, Dry Creek, and downstream waters. Domestic and industrial use of water, results in an increase in the mineral content of the wastewater. The minerals include calcium, sodium, sulfate, and other dissolved salts, including chloride. When water evaporates, salts accumulate in soil. With increasing salinity in the soil of the root zone, plants expend more energy on adjusting the salt concentration in plant tissues to obtain needed water from the soil, and less energy is available for growth. The salinity of wastewater is determined by measuring EC or TDS, which may be used as parameters to determine the suitability of wastewater for irrigation.

Monitoring results submitted by the Discharger indicated that concentrations of Electrical Conductivity (EC) and Total Dissolved Solids (TDS) exceeded Agriculture Irrigation Objectives. However, no data was submitted by the Discharger to indicate the Agriculture Irrigation Objectives were exceeded in the receiving water. The proposed Order contains a Provision for a study to determine whether EC and TDS exceed the Agriculture Irrigation Objectives in the receiving water. The Provision allows the proposed Order to be reopened if new data indicate Effluent Limitations are necessary.

EC (Electrical Conductivity, also Specific Conductance)

To protect the beneficial use of water for agricultural use, studies have recommended an Agricultural Water Quality Goal of 700 $\mu\text{mhos/cm}$, for EC. The California Department of Health Services has recommended an SMCL for EC of 900 $\mu\text{mhos/cm}$, with an upper level of 1600 $\mu\text{mhos/cm}$, and a short-term level of 2200 $\mu\text{mhos/cm}$.

In the Basin Plan, Numeric Water Quality Objectives for the protection of beneficial uses have been established for EC in the Sacramento River, between the Colusa Basin Drain and the "I" Street Bridge and in the Feather River, from the Fish Barrier Dam at Oroville to the Sacramento River. The discharge to Rock Creek is eventually tributary to the Feather River between the Fish Barrier Dam and the Sacramento River. The Basin Plan water quality objectives for EC are further explained above. However, sampling shows there is assimilative capacity in the Sacramento and Feather Rivers for the dissolved salts discharged from SMD1.

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Effluent monitoring results submitted by the Discharger (see Table 6) include reported concentrations of EC, in twelve samples, at 480, 580, 620, 630, 650, 650, 680, 690, 690, 730, 730, and 840 $\mu\text{mhos/cm}$. The effluent EC values do not exceed the SMCL and it appears there is assimilative capacity in the Sacramento and Feather Rivers for the dissolved salts, including EC, discharged from SMD1. The three samples with the highest concentrations exceeded the Agriculture Water Quality Goal in the effluent.

The monitoring results submitted by the Discharger did not contain data for EC concentrations in the receiving water and it is not possible to determine whether the Agriculture Irrigation Objectives were exceeded in the receiving water. Therefore, the proposed Order contains a Provision for a study with a compliance schedule to determine whether concentrations of EC in the receiving water exceed the Agriculture Irrigation Objectives. The Provision allows the Regional Board to reopen the permit if monitoring results indicate Effluent Limitations are necessary.

TDS (Total Dissolved Solids)

The California Department of Health Services has recommended an SMCL for TDS of 500 mg/l. To protect the beneficial use of water for agricultural use, studies have recommended an Agricultural Water Quality Goal of 450 mg/l for TDS (lower than the SMCL). Effluent monitoring results submitted by the Discharger (see Table 6) include reported concentrations of TDS in twelve samples, at 240, 310, 330, 330, 340, 340, 340, 360, 360, 360, 370, and 400 mg/l.

While none of the concentrations exceeded the goal, Regional Board staff conducted a Reasonable Potential analysis as detailed in the U.S. EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD). (The steps of the Reasonable Potential Analysis are outlined above describing the Reasonable Potential Analysis for Chloride.)

For TDS

$$n = 12 \text{ and } \text{Highest Value} = 400 \text{ mg/l}$$

$$n = 12 \Rightarrow C_v = 0.1149$$

$$n = 12 \text{ and } C_v = 0.1149 \Rightarrow \text{Multiplication Factor} = 1.22 \text{ (Table 3-1 of the TSD)}$$

$$400 \text{ mg/l} \times 1.22 = 488 \text{ mg/l}$$

$$488 \text{ mg/l} > 450 \text{ mg/l} \Rightarrow \text{Reasonable Potential exists to exceed Agriculture Irrigation Goal in Effluent}$$

The Reasonable Potential analysis indicates a statistical probability for TDS in the effluent to exceed the Agriculture Irrigation goal. The monitoring results submitted by the Discharger did not contain data for TDS concentrations in the receiving water and it is not possible to determine whether the Agriculture Irrigation Objectives were exceeded in the receiving water. Therefore, the proposed Order contains a Provision for a study with a compliance schedule to determine whether concentrations of TDS in the

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receiving water exceed the Agriculture Irrigation Objectives. The Provisions allows the Regional Board to reopen the permit if monitoring results indicate Effluent Limitations are necessary.

* Calculation of C_v for Total Dissolved Solids Data:

Y	f	fY	$y = Y - \bar{Y} $	y^2	fy^2
240	1	240	100	10,000	10,000
310	1	310	30	900	900
330	2	660	10	100	200
340	3	1,020	0	0	0
360	3	1,080	20	400	1,200
370	1	370	30	900	900
400	1	400	60	3,600	3,600
Totals	$\Sigma f = 12$	$\Sigma fY = 4,080$			$\Sigma fy^2 = 16,800$

Iron Concentration ($\mu\text{g/l}$) = Y
 Frequency = f
 Number of Samples = n = $\Sigma f = 12$

Mean = $\bar{Y} = \frac{\Sigma fY}{n} = \frac{4080}{12} = 340$

Standard Deviation = $S = \sqrt{\frac{\Sigma fy^2}{n-1}} = \sqrt{\frac{16,800}{11}} = \sqrt{1527.27} = 39.08$

Coefficient of Variation = $C_v = \frac{S}{\bar{Y}} = \frac{39.08}{340} = 0.1149$

Analytical Reporting Limits Higher Than Criteria Concentrations/Detected Concentration Just Below Criterion

A substantial number of constituents including Volatile Organics, Semi-Volatile Organics, Inorganics, and Pesticides and PCB's were not analyzed at or below the criterion concentration by commercial laboratories. Therefore, reasonable potential cannot be determined accurately at this time for the following constituents:

CONSTITUENTS ANALYZED ABOVE CRITERIA

<u>VOLATILE ORGANICS</u>	<u>SEMI VOLATILE ORGANICS</u>	<u>PESTICIDES - PCB'S</u>
1,1-Dichloroethene	1,2-Benzanthracene	4,4-DDD
1,1,2,2-Tetrachloroethane	1,2-Diphenylhydrazine	4,4-DDE
1,2-Dichloroethane	2-Chlorophenol	4,4-DDT

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Acrylonitrile	2,4-Dichlorophenol	alpha-Hexachlorocyclohexane (BHC)
Carbon Tetrachloride	2,4-Dinitrotoluene	gamma-BHC
Dibromochloromethane	2,4,6-Trichlorophenol	Aldrin
Hexachlorobenzene	2,6-Dinitrotoluene	Chlordane
Hexachlorobutadiene	3,3-Dichlorobenzidine	Dieldrin
	Benzidine	Heptachlor
	Benzo(a)pyrene	Heptachlor Epoxide
	Benzo(b)fluoranthene	PCB-1016
	Benzo(k)fluoranthene	PCB-1221
<u>INORGANICS and METALS</u>	Bis(2-chloroethyl)ether	PCB-1232
Cadmium	Bis(2-ethylhexyl)phthalate	PCB-1242
Chromium (VI)	Butyl benzyl phthalate	PCB-1248
Silver	Chrysene	PCB-1254
Phosphorus	Di-n-butylphthalate	PCB-1260
Sulfide	Di-n-octylphthalate	Toxaphene
	Dibenzo(a,h)-anthracene	Atrazine
	Hexachlorocyclopentadiene	Carbofuran
	Indeno(1,2,3-c,d)pyrene	Dibromochloropropane (DBCP)
	N-Nitrosodimethylamine	Diquat
	N-Nitrosodi-n-propylamine	Ethylene Dibromide
		Simazine (Princep)
		2,3,7,8-TCDD (Dioxin)
		Diazinon
		Chlorpyrifos

Effluent Limitations were established for constituents that were reported by the laboratory to be present at concentrations above the reporting limits and the water quality criteria, including Silver, DDE, Heptachlor Epoxide, PCBs, Atrazine, Dioxins and Furans, and Bis(2-ethylhexyl)phthalate.

CONSTITUENTS DETECTED JUST BELOW CRITERIA

VOLATILE ORGANICS
Dichloromethane

Effluent Monitoring data, submitted by the Discharger, contained concentrations of Dichloromethane, in three of seven samples, at 1.2, 2.4, and 3.1 µg/l. The CTR Criterion for Dichloromethane for the protection of Human Health (30-Day Average) for Drinking Water (consumption of water and aquatic organisms) is 4.7 µg/l. The detected concentrations do not exceed but are very close to the Criterion.

The attached Monitoring and Reporting Program requires the Discharger to continue monitoring for Priority Pollutants, including the constituents listed above, and other constituents, once a year in accordance with the SIP, Sections 2.3 and 2.4. The proposed Order also contains a Provision that requires additional Priority Pollutant analysis when flows are greater than 3.5 MGD and the gravity filters are bypassed.

Effluent Limitations Not Required

Regional Board staff reviewed information submitted as part of the application and in studies (see Tables 1 through 6). Effluent limitations were considered for all detected constituents. Effluent Limitations were **not** applied to the following constituents:

All Constituents for which the Laboratory Reported Non-detectable (ND) Concentrations with Acceptable Reporting Limits

The constituents are as follows:

Pesticides (Table 4): Bentazon, beta-BHC, delta-BHC, Di(2-ethylhexyl)adipate, Dibromochloropropane, Endosulfan Sulfate, Endothall, Endrin, Endrin Aldehyde, Glyphosphate, Methoxychlor, Oxamyl, Picloram, and Thiobencarb;

Volatiles (Table 2): 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethane, 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dichloropropane, 1,3-Dichlorobenzene, 1,3-Dichloropropene, 2-Chloroethyl vinyl ether, Acrolein, Benzene, Bromoform, Bromomethane, Chloroethane, cis-1,2-Dichloroethene, Ethylbenzene, Freon 113, Naphthalene, Styrene, Tetrachloroethene, trans-1,2-Dichloroethene, Trichloroethene, Trichlorofluoromethane, Vinyl Chloride, and Total Xylenes;

Semi-volatiles (Table 3): 2-Chloronaphthalene, 2-methyl-4,6-Dinitrophenol, 2,4-Dimethylphenol, 2,4-Dinitrophenol, 2-Nitrophenol, 4-Bromophenyl phenyl ether, 4-Chloro-3-methylphenol, 4-Chlorophenyl phenyl ether, 4-Nitrophenol, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(g,h,i)perylene, Bis(2-chloroethoxy)methane, Bis(2-chloroisopropyl)ether, Dimethyl phthalate, Fluoranthene, Fluorene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Isophorone, Naphthalene, Nitrobenzene, N-Nitrosodiphenylamine, Phenanthrene, Phenol, and Pyrene;

Inorganics and Metals (Tables 1 and 6): Asbestos, Beryllium, Cyanide, and Sulfite.

All Constituents for which No Water Quality Criteria Have Been Promulgated

The constituents are Hardness and Phosphorus (see Table 6).

All Constituents with Concentrations Less Than Applicable Water Quality Criteria and/or Negative Reasonable Potential

The constituents are: Antimony, Arsenic, Barium, Cadmium, Chloride, Chlorobenzene, Chloromethane, 1,4-Dichlorobenzene, Chromium (Total) and Chromium III, Chromium VI, Fluoride, Iron, MBAS, Molinate (Ordram), Nickel, Pentachlorophenol, Sulfate, Sulfide, Thallium, and Toluene.

Antimony

DHS has adopted a Drinking Water Standards PMCL for Antimony of 6 µg/l. In monitoring results submitted by the Discharger (see Table 1), both dissolved and total recoverable Antimony was detected in twelve samples, with the highest concentrations of 0.438 and 0.455 µg/l, respectively. All detected Antimony concentrations were well below the PMCL. No effluent limitations for Antimony are included in the proposed Order.

Arsenic

U.S. EPA has adopted a PMCL for Arsenic of 10 µg/l. In monitoring results submitted by the Discharger (see Table 1), both dissolved and total recoverable Arsenic was detected in twelve samples, with the highest concentrations of 0.566 and 0.625 µg/l, respectively. All detected Arsenic

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concentrations were well below the PMCL. No effluent limitations for Arsenic are included in the proposed Order.

Barium

DHS has adopted a Drinking Water Standards PMCL for Barium of 1,000 µg/l. In monitoring results submitted by the Discharger (see Table 1) both dissolved and total recoverable Barium was detected in twelve samples, with the highest concentrations of 8.68 and 9.20 µg/l, respectively. All detected Barium concentrations were well below the PMCL. No effluent limitations for Barium are included in the proposed Order.

Cadmium

U.S. EPA adopted the CTR with criteria for Cadmium to protect freshwater aquatic life. The Cadmium criteria are hardness-dependent. In monitoring results submitted by the Discharger (see Table 1) both dissolved and total recoverable Cadmium was detected in twelve samples, with the highest concentrations of 0.111 and 0.072 µg/l, respectively.

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the lowest effluent hardness of 61 mg/l the Chronic and Acute Criteria (expressed as the dissolved Cadmium fraction) are calculated to be 1.6 µg/l and 2.5 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Cadmium fraction) are calculated to be 1.7 µg/l and 2.6 µg/l. None of the Cadmium concentrations exceeded the Cadmium Criteria calculated with an effluent hardness of 61 mg/l; therefore, the hardness and Cadmium concentrations in the effluent alone do not create toxic conditions.

However, the Discharger also submitted hardness data for Rock Creek, upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, *“When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...”* The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Cadmium fraction) are calculated to be 0.68 µg/l and 0.74 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Cadmium fraction) are calculated to be 0.70 µg/l and 0.74 µg/l, respectively. All detected Cadmium concentrations were below the criteria. No effluent limitations for Cadmium are included in the proposed Order.

Chloride

To protect the beneficial use of water for agricultural use, studies have recommended an Agricultural Water Quality Goal of 106 mg/l, for Chloride. Effluent monitoring results submitted by the Discharger (see Table 6) include reported concentrations of Chloride in seven samples at 48, 48, 53, 55, 56, 63, and 65 mg/l.

While none of the concentrations exceeded the goal, Regional Board staff conducted a Reasonable Potential analysis as detailed in the U.S. EPA *Technical Support Document for Water Quality-based*

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Toxics Control (TSD). Box 3-2 on page 53 of the TSD contains an outline of the Reasonable Potential analysis (a statistical procedure), summarized as follows:

- Step 1 Determine the total number of observations (n) and the highest value in the data set;
 Step 2 Determine the coefficient of variation (C_V) for the data set. For a data set where $n < 10$, the uncertainty in the C_V is too large to calculate a standard deviation or mean with sufficient confidence, therefore the C_V is estimated to equal 0.6. For a data set where $n \geq 10$, the C_V is calculated.
 Step 3 Knowing n and C_V , determine the appropriate ratio from Table 3-1 or 3-2 on page 54 of the TSD. For the proposed Order, Table 3-1 was used.
 Step 4 Multiply the highest value in the data set by the multiplication factor from Table 3-1.
 Step 5 Compare the value from Step 4 with the applicable water quality standard. If the value from Step 4 is greater than the water quality standard, there is Reasonable Potential for concentrations of the constituent to exceed the water quality standard.

Note: The SIP contains instructions for including data reported as not detected in the calculation of the C_V : If (a) the number of effluent data points is less than 10, or (b) at least 80 percent of the data are reported as not detected, the C_V shall be set to equal 0.6. When calculating C_V , if an effluent data point is below the detection limit for the pollutant in that sample, one-half of the detection limit shall be used as a value in the calculations.

For Chloride:

$$n = 12 \text{ and } \text{Highest Value} = 65 \text{ mg/l}$$

$$n = 12 \Rightarrow C_V = 0.13$$

$$n = 12 \text{ and } C_V = 0.13 \Rightarrow \text{Multiplication Factor} = 1.26 \text{ (Table 3-1 of the TSD)}$$

$$65 \text{ mg/l} \times 1.26 = 81.9 \text{ mg/l}$$

$$81.9 \text{ mg/l} < 106 \text{ mg/l} \Rightarrow \text{NO Reasonable Potential exists to exceed Agriculture Irrigation Goal in Effluent}$$

The Reasonable Potential analysis indicates there is not a statistical probability for Chloride to exceed the Agriculture Irrigation goal in the effluent. No effluent limitations for Chloride are included in the proposed Order.

* Calculation of C_V for Chloride Data:

Y	f	fY	$y = Y - \bar{Y} $	y^2	fy^2
42	1	42	12.25	150.06	150.06
48	2	96	6.25	39.06	78.12

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50	2	100	4.25	18.06	36.12
53	1	53	1.25	1.56	1.56
55	1	55	0.75	0.56	0.56
56	1	56	1.75	3.06	3.06
60	1	60	5.75	33.06	33.06
61	1	61	6.75	45.56	45.56
63	1	63	8.75	76.56	76.56
65	1	65	10.75	115.56	115.56
<i>Totals</i>	$\Sigma f = 12$	$\Sigma fY = 651$			$\Sigma fy^2 = 539.72$

Iron Concentration ($\mu\text{g/l}$) = Y
 Frequency = f
 Number of Samples = n = $\Sigma f = 12$

Mean = $\bar{Y} = \frac{\Sigma fY}{n} = \frac{651}{12} = 54.25$

Standard Deviation = $S = \sqrt{\frac{\Sigma fy^2}{n-1}} = \sqrt{\frac{539.72}{11}} = \sqrt{49.07} = 7.80$

Coefficient of Variation = $C_v = \frac{S}{\bar{Y}} = \frac{7.80}{54.25} = 0.13$

Chlorobenzene

DHS has adopted a Drinking Water Standards PMCL for Chlorobenzene of 70 $\mu\text{g/l}$ and U.S. EPA adopted a criterion of 20 $\mu\text{g/l}$ in the National Ambient Water Quality Criteria for Taste and Odor. In monitoring results submitted by the Discharger (see Table 2) Chlorobenzene was estimated by the laboratory to be 0.078 $\mu\text{g/l}$ in one sample, which is below both criteria. No effluent limitations for Chlorobenzene are included in the proposed Order.

Chloromethane

U.S. EPA has issued a Health Advisory for Chloromethane of 3 $\mu\text{g/l}$. In monitoring results submitted by the Discharger (see Table 2), Chloromethane was estimated by the laboratory to be 0.19 $\mu\text{g/l}$ in one sample, which is below the criterion. No effluent limitations for Chloromethane are included in the proposed Order.

1,4-Dichlorobenzene

DHS has adopted a Drinking Water Standards PMCL for 1,4-Dichlorobenzene of 5 $\mu\text{g/l}$. In monitoring results submitted by the Discharger (see Table 2), 1,4-Dichlorobenzene was estimated by the laboratory to be in five of twelve samples, with the highest estimated concentration at 0.16 $\mu\text{g/l}$. All detected 1,4-Dichlorobenzene concentrations were well below the PMCL. No effluent limitations for 1,4-Dichlorobenzene are included in the proposed Order.

Chromium (Total) and Chromium III

For Total Chromium, the California DHS has developed a PMCL of 50 µg/l. Monitoring results submitted by the Discharger (see Table 1), indicated the presence of both dissolved and total recoverable Chromium (Total) in eight of twelve samples, at concentrations of 0.65 and 0.62 µg/l, respectively. All detected Chromium (Total) concentrations were well below the PMCL. No effluent limitations for Chromium (Total) are included in the proposed Order.

For Chromium III, the CTR and U.S. EPA Recommended Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life are hardness-dependent criteria. For hardness-dependent criteria, worst-case conditions occur at the lowest hardness concentrations. The lowest reported hardness for SMD1, including effluent and Rock Creek, was 20 mg/l. Toxic concentrations in the CTR would be 48 µg/l (dissolved) and 55 µg/l (total recoverable), and toxic concentrations in the Ambient Water Quality Criteria would be 20 µg/l and 23 µg/l, respectively. The concentrations of Chromium (Total) were well below the toxic concentrations for Chromium III. No effluent limitations for Chromium III are included in the proposed Order.

Chromium VI

For Chromium VI, the CTR Criteria for the Protection of Freshwater Aquatic Life are presented for the dissolved fraction as both a Chronic or Continuous Concentration (4-Day Average) of 11 µg/l and an Acute or Maximum Concentration (1-Hour Average) of 16 µg/l. In monitoring results submitted by the Discharger (see Table 6), Chromium VI was estimated by the laboratory to be in two of twelve samples, with the highest estimated concentration at 0.96 µg/l, which is below both criteria. No effluent limitations for Chromium VI are included in the proposed Order.

Fluoride

For Fluoride, the California DHS has developed a PMCL of 2000 µg/l. Monitoring results submitted by the Discharger (see Table 6), indicated the presence of Fluoride in seven of twelve samples, at concentrations up to 280 µg/l, which is below the criterion. No effluent limitations for Fluoride are included in the proposed Order.

Iron

For Iron, the U.S. EPA and the California DHS have developed a Drinking Water Standards Secondary Maximum Level (SMCL) of 300 µg/l. Effluent monitoring results submitted by the Discharger (see Table 1), indicated the presence of Total Recoverable Iron, in twelve samples, at concentrations of 55.7, 61.1, 63.6, 65.5, 66.2, 68.7, 71.4, 76.0, 77.8, 95.2, 109.0, and 110.0 µg/l.

While none of the concentrations exceeded the SMCL, Regional Board staff conducted a Reasonable Potential analysis, as detailed in the U.S. EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD), to determine whether there was a statistical probability for the concentration of Iron in the effluent to exceed the SMCL. (The steps of the Reasonable Potential Analysis are outlined in the discussion of Chloride.)

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For Iron

1. $n = 12$ and **Highest Value = 110.0 $\mu\text{g/l}$**
2. $n = 12 \Rightarrow C_v = 0.24$
3. $n = 12$ and $C_v = 0.24 \Rightarrow$ **Multiplication Factor = 1.5** (Table 3-1 of the TSD)
4. **110.0 $\mu\text{g/l}$ \times 1.5 = 165 $\mu\text{g/l}$**
5. **165 $\mu\text{g/l}$ < 300 $\mu\text{g/l}$ \Rightarrow NO Reasonable Potential exists to exceed the SMCL**

The Reasonable Potential Analysis indicated that there is not a statistical probability for Iron in the effluent to exceed the SMCL. Therefore, no effluent limitations are included for Iron.

* Calculation of C_v for Total Recoverable Iron Data:

Y	f	fY	$y = Y - \bar{Y} $	y^2	fy^2
55.7	1	55.7	20.98	440.16	440.16
61.1	1	61.1	15.58	242.74	242.74
63.6	1	63.6	13.08	171.09	171.09
65.5	1	65.5	11.18	124.99	124.99
66.2	1	66.2	10.48	109.83	109.83
68.7	1	68.7	7.98	63.68	63.68
71.4	1	71.4	5.28	27.88	27.88
76.0	1	76.0	0.68	0.46	0.46
77.8	1	77.8	1.12	1.25	1.25
95.2	1	95.2	18.52	342.99	342.99
109.0	1	109.0	32.32	1044.58	1044.58
110.0	1	110.0	33.32	1110.22	1110.22
<i>Totals</i>	$\Sigma f = 12$	$\Sigma fY = 920.2$			$\Sigma fy^2 = 3679.87$

Iron Concentration ($\mu\text{g/l}$) = Y
 Frequency = f
 Number of Samples = $n = \Sigma f = 12$

Mean = $\bar{Y} = \frac{\Sigma fY}{n} = \frac{920.2}{12} = 76.68$

Standard Deviation = $S = \sqrt{\frac{\Sigma fy^2}{n-1}} = \sqrt{\frac{3679.87}{11}} = \sqrt{334.53} = 18.29$

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$$\text{Coefficient of Variation} = C_v = \frac{S}{\bar{Y}} = \frac{18.29}{76.68} = 0.24$$

MBAS (Methylene Blue Activated Substances, Foaming Agents or Surfactants)

For MBAS, the U.S. EPA and the California DHS have developed an SMCL of 500 µg/l (0.50 mg/l). However, the existing Order No. 97-113 included Effluent Limitations for MBAS of 1.0 mg/l as a Monthly Average and 2.0 mg/l as a Daily Maximum; the source of these Effluent Limitations is not clear. To conduct a Reasonable Potential Analysis (determine whether MBAS has a reasonable potential to cause or contribute to an in-stream excursion above water quality standards) the detected concentrations of MBAS must be compared to the SMCL of 500 µg/l.

Effluent monitoring results submitted by the Discharger (see Table 6), indicated the presence of MBAS, in eleven of twelve samples, at concentrations of 0.068, 0.075, 0.075, 0.10, 0.11, 0.11, 0.12, 0.13, 0.14, 0.21, and 0.22 mg/l.

While none of the concentrations exceeded the SMCL, Regional Board staff conducted a Reasonable Potential Analysis as detailed in the U.S. EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD). (The steps of the Reasonable Potential Analysis are outlined below in the discussion for Chloride and the process to calculate C_v is outlined in the discussions for Chloride and Copper)

For MBAS

1. $n = 12$ and **Highest Value = 0.22 mg/l**
2. $n = 12 \Rightarrow C_v = 0.46$
3. $n = 12$ and $C_v = 0.46 \Rightarrow$ **Multiplication Factor = 2.24** (Table 3-1 of the TSD)
4. **0.22 mg/l x 2.24 = 0.493 mg/l**
5. **0.493 mg/l < 0.50 mg/l**
0.493 mg/l \approx 0.50 mg/l

The Reasonable Potential Analysis indicated statistically, based on existing data, the highest expected concentration of MBAS is only slightly less than the criterion. When rounded off, the statistically expected maximum concentration is equal to the criterion. The Reasonable Potential Analysis did not indicate a potential to exceed the SMCL criterion.

In accordance with Federal Regulations, 40 CFR 122.44(l)(2)(i)(B)(1), the adoption of less stringent effluent limitations for MBAS is not considered backsliding if information is available which was not available at the time of permit issuance. New monitoring data indicated that there was no reasonable potential to exceed the SMCL.

In accordance with Federal Regulations, 40 CFR 122.44(l)(2)(i)(B)(2), the adoption of less stringent effluent limitations for MBAS is not considered backsliding if technical mistakes were made in issuing the permit. The Effluent Limitations for MBAS in existing Order No. 97-113 do not appear to be based on water quality standards and no calculations were shown for establishing water quality based Effluent Limitations.

In accordance with Federal Regulations, 40 CFR 122.44(l)(2)(ii), a permit to discharge to surface waters may not be renewed with a less stringent effluent limitation, if implementation of the limitation would result in violation of a water quality standard. The Reasonable Potential Analysis for MBAS indicated that there was a statistical potential for concentrations of MBAS to almost achieve the SMCL. However, statistically, the estimated maximum concentration did not exceed the SMCL.

The proposed Order does not contain Effluent Limitations for MBAS.

Molinate (Ordram)

Molinate is an herbicide but is not a chlorinated hydrocarbon. For Molinate, the California DHS has developed a PMCL of 20 µg/l. Monitoring results submitted by the Discharger (see Table 4), indicated the presence of Molinate in one of seven samples, at a concentration of 2.3 µg/l, which is below the criterion. No effluent limitations for Molinate are included in the proposed Order.

Nickel

U.S. EPA adopted the CTR with criteria for Nickel to protect freshwater aquatic life. The Nickel criteria are hardness-dependent. In monitoring results submitted by the Discharger (see Table 1), both dissolved and total recoverable Nickel was detected in twelve samples, with the highest concentrations of 3.40 and 3.25 µg/l, respectively.

The monitoring data submitted by the Discharger also contained effluent hardness data that ranged between 61 and 340 mg/l. Using the lowest effluent hardness of 61 mg/l the Chronic and Acute Criteria (expressed as the dissolved Nickel fraction) are calculated to be 34 µg/l and 310 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Nickel fraction) are calculated to be 34 µg/l and 310 µg/l. None of the Nickel concentrations exceeded the Nickel Criteria calculated with an effluent hardness of 61 mg/l; therefore, the hardness and Nickel concentrations in the effluent alone do not create toxic conditions.

However, the Discharger also submitted hardness data for Rock Creek, upstream of the effluent discharge point, which ranged between 20 and 260 mg/l. As stated in Section 1.2 of the SIP, *“When implementing the provisions of this Policy, the RWQCB shall ensure that criteria/objectives are properly adjusted for hardness or pH, using the hardness or pH values for the receiving water...”* The worst-case conditions are represented when the hardness of Rock Creek is 20 mg/l. Using the receiving water hardness of 20 mg/l and the appropriate equations shown above, the Chronic and Acute Criteria (expressed as the dissolved Nickel fraction) are calculated to be 13 µg/l and 120 µg/l, respectively. Similarly, the Chronic and Acute Criteria (expressed as the total recoverable Nickel fraction) are

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calculated to be 13 µg/l and 120 µg/l, respectively. All detected Nickel concentrations were below the criteria. No effluent limitations for Nickel are included in the proposed Order.

Pentachlorophenol

U.S. EPA adopted the CTR with criteria for Pentachlorophenol, for the Protection of Human Health (30-Day Average) of 0.28 µg/l. In monitoring results submitted by the Discharger (see Table 3), Pentachlorophenol was estimated by the laboratory to be in one of six samples at 0.14 µg/l, which is below the criterion. No effluent limitations for Pentachlorophenol are included in the proposed Order.

Sulfate

For Sulfate, the California DHS has developed a Secondary MCL of 250,000 µg/l. Monitoring results submitted by the Discharger (see Table 6), indicated the presence of Sulfate in twelve samples, at concentrations up to 59,000 µg/l, which is below the criterion. No effluent limitations for Sulfate are included in the proposed Order.

Sulfide

Hydrogen Sulfide can be toxic to aquatic organisms. U.S. EPA adopted National Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for

Hydrogen Sulfide of 2 µg/l (Instantaneous Maximum). However, there is no approved analytical method for Hydrogen Sulfide. The laboratory analysis is for Sulfide as S and does not distinguish between the Sulfide in Hydrogen Sulfide and other Sulfides.

In monitoring results submitted by the Discharger (see Table 6), Sulfide was detected in five of twelve effluent samples at up to 2.6 µg/l. There are no water quality criteria for Sulfide. The WWTP has not been reported to have the Hydrogen Sulfide odor. No effluent limitations for Sulfide are included in the proposed Order.

Thallium

For Thallium, the CTR Criterion for the Protection of Human Health Sources of Drinking Water (consumption of water and organisms) is 1.7 µg/l as a 30-Day Average. In monitoring results submitted by the Discharger (see Table 1), Thallium was reported in three of twelve samples, with the highest estimated concentration at 0.002 µg/l, which is below the criterion. No effluent limitations for Thallium are included in the proposed Order.

Toluene

DHS has adopted a Drinking Water Standards PMCL for Toluene of 150 µg/l. Monitoring results submitted by the Discharger (see Table 2) contained Toluene in one of five samples at a concentration 0.98 µg/l, which does not exceed the PMCL. Therefore, an Effluent Limitation for Toluene is **not** included in the proposed Order.

Enforcement History

22 March 1996, Administrative Civil Liability Order No. 96-086 and Cease and Desist Order No. 96-087.

Prior to 1996, the Discharger had a history of noncompliance with waste discharge requirements including violations of limits for pH, coliform organisms, Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), turbidity, chlorine, and ammonia. The violations are due to a combination of bypasses, overflows, heavy flows into the facility, operations failures, and inadequate treatment units.

Former Waste Discharge Requirements Order No. 92-116 states, in part, as follows:

"A. Discharge Prohibitions:

2. *The bypass or overflow of wastes to surface waters is prohibited, except as allowed by Standard Provision A.13.*

B. Effluent Limitations:

1. *The discharge of an effluent in excess of the following limits is prohibited:*

<u>Constituents</u>	<u>Units</u>	<u>Period</u>	<u>Monthly Average</u>	<u>Weekly Average</u>	<u>Monthly Median</u>	<u>Daily Maximum</u>
Chlorine Residual After Dechlorination	mg/l	All Year	--	--	--	0.02

2. *The average operating turbidity of the effluent for the period of 1 April through 30 November must not exceed 2 NTUs and must not exceed 5 NTUs more than 5% of the time during any 24-hour period.*
3. *The discharge between 1 April and 30 November shall be an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater (nonrestricted recreational use as defined in Title 22, Division 4, California Code of Regulations, Section 60301. et. seq.)*
5. *The discharge shall not have a pH less than 6.5 nor greater than 8.5.*

D. Receiving Water Limitations

The Discharge shall not cause the following in Dry Creek:

6. *Un-ionized ammonia (NH₃) to exceed 0.025 mg/l (as N).*
9. *Turbidity to increase more than 20 percent over background levels.*
10. *The normal ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units."*

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An Administrative Civil Liability Order (ACLO) and Cease and Desist Order (C&D) were adopted at the 22 March 1996 meeting of the Regional Board for violations of Order 92-116 as follows:

A. Cease and Desist Order No. 96-087

The turbidity and chlorine residual violations were due primarily to bypasses, overflows, heavy flows into the WWTP, and operations failures at the WWTP. The ammonia and pH violations were due to the inability of the WWTP to remove ammonia adequately from the waste stream. The Cease and Desist Order contained a compliance schedule that required evaluation of the WWTP, short term corrective actions to improve WWTP performance, construction of new ammonia removal facilities to begin by 1 April 1997, and complete construction and full compliance by 1 April 1998.

The Discharger determined that infiltration and inflow into the collection system played a role in the bypasses and overflows at the WWTP. They have undertaken a program to find the infiltration and inflow points, and repair and retrofit the collection system. The Discharger has also installed new overflow tanks and alarms. The Discharger proposed and constructed a third train of RBCs within the required compliance schedule in an attempt to comply with the ammonia limitations.

The improvements to the collection system are ongoing to date. The Cease and Desist Order required that construction be completed by 1 April 1998. However, the newly constructed third RBC, along with the two existing RBCs, failed to reduce ammonia to levels that complied with Receiving Water Limitations. In an effort to reduce violations of the ammonia Receiving Water Limitations, the Discharger has purchased water from Placer County Water Agency and discharged it to Rock Creek for dilution purposes prior to the discharge point. Ammonia violations were reduced but continued to occur. The Discharger has completed significant improvements at the WWTP and to the collection system, however, they have not complied with the schedule in the Cease and Desist Order.

In May 2000, the Discharger submitted a proposal to construct new facilities and retrofit existing facilities to provide additional ammonia removal. Construction began on these new facilities and retrofits in 2002 and has been completed.

B. Administrative Civil Liability Order No. 96-086

The Administrative Civil Liability Order (ACLO) required that the Discharger pay \$25,000 to the Cleanup and Abatement Account for the violations described above. The Order also required payment of an additional \$25,000 should the Discharger fail to achieve full compliance with the Cease and Desist Order and upon written demand of the Regional Board's Executive Officer.

The Discharger paid the first \$25,000 immediately. The Discharger made improvements to the collection system and the treatment facilities, and constructed the third Rotating Biological Contactor in an effort to reduce the discharge of ammonia. Unfortunately, the improvements were not adequate to achieve full compliance with the CDO.

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In a letter, dated 16 December 1999, the Executive Officer demanded payment of the additional \$25,000, by 7 January 2000, for failure to complete corrective action and eliminate violations of the Receiving Water Limitation for ammonia within the time allotted by the Cease and Desist Order. In a letter to the Executive Officer, dated 6 January 2000, the Discharger explained that significant improvements had been made to the WWTP and collection system, that ammonia levels in the discharge had decreased but have not been eliminated, and that additional ammonia removal facilities were in the design phase. The Discharger requested that payment of the additional \$25,000 be deferred to a future date arranged in a meeting between Discharger and Board staff. In a 20 January 2000 letter from the Executive Officer to the Discharger, it was explained that Placer County had not complied with the terms of the ACLO and that Regional Board staff does not have the authority to review or reconsider the ACLO. Therefore payment of the additional \$25,000 was required by 31 January 2000. The additional \$25,000 was paid 4 February 2000, four days late.

13 September 2000 Notice of Violation

The NPDES permit was renewed in 1997 when the Regional Board adopted Waste Discharge Requirements Order No. 97-113. A 13 September 2000 Notice of Violation (NOV) was sent to the Discharger for the following violations:

- a. A 22 June 2000 inspection by Regional Board staff revealed the discharge of foam to the receiving water;
- b. An 8 August 2000 plant upset resulted in violations of effluent turbidity, total coliform, BOD, and TSS limitations, and receiving water fecal coliform and turbidity limitations; and
- c. The Discharger Self Monitoring Reports from January through July 2000 showed 25 violations of effluent limitations, receiving water limitations, and reporting requirements, including 12 violations of the Receiving Water Limitations for ammonia.

The NOV required that a work plan be submitted by 31 October 2000 for investigating options to reduce foam and to connect an alarm to the plant system to prevent plant upsets similar to the one that occurred 8 August 2000. Because plant improvements were to be completed by mid 2002, that should improve the quality of the discharge, the Discharger was not required to do anything else to mitigate the violations reported in the monitoring reports. The NOV strongly recommended that denitrification be included in the plant upgrades. No work plan was submitted.

16 April 2001 Administrative Civil Liability Complaint No. 5-01-514

An Administrative Civil Liability Complaint (ACLC) was issued 16 April 2001 for violations of effluent limitations and reporting requirements under California Water Code Section 13385. The section of the Water Code requires the Regional Board to assess mandatory penalties of \$3000 for the first serious violation within a six month period, for each serious violation, not counting the first, if the discharger commits two or more serious violations within any six month period, and for each serious violation, not counting the first three, if the discharger commits any of several violations four or more times in any six

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month period. The Discharger violated effluent limitations and reporting requirements under Section 13385 for a mandatory penalty of \$12,000. The violations requiring mandatory minimum penalties included violations of the Effluent Limitations for Total Coliform Organisms, Settleable Solids, Methylene Blue Activated Substances (MBAS), Turbidity, Total Suspended Solids, pH, and Chlorine Residual. The ACLC notified the Discharger that a hearing may be requested at the Regional Board's meeting in mid June 2001 or the hearing may be waived and the penalty paid in full by 4 May 2001. In addition, in lieu of the mandatory penalty for the first serious violation, the Discharger was informed that they might request, by 4 May 2001, to complete a pollution prevention plan or conduct a supplemental environmental project approved by the Executive Officer.

In a 30 April 2001 letter to Regional Board staff, the Discharger disputed the Regional Board's assessment that several of the violations required mandatory penalties. In a 1 May 2001 letter to the Discharger, Regional Board staff provided additional explanation that the mandatory penalties described in the ACLC do apply. In a 4 May 2001 letter, the Discharger notified the Regional Board that payment of the penalty would require approval of the Placer County Board of Supervisors at the next meeting on 29 May 2001. The Discharger paid the \$12,000 mandatory penalty on 16 July 2001; 48 days after the County Board's meeting and 73 days after the date specified in the ACLC.

12 July 2001 Notice of Violation

A Notice of Violation (NOV) was issued 12 July 2001 for performing acute toxicity bioassays without the required certification, for failure to keep a log of receiving water conditions, report detection levels for all chlorine analyses, and monitor BOD on three occasions, for effluent ammonia violations on 16 occasions, a pH violation, and an acute toxicity violation, and for an exceedance of the daily maximum chlorine limitation, which is considered a serious violation under California Water Code Section 13385.

The NOV required submittal of a technical report by 10 August 2001 that addresses the violations and chronic toxicity. The Discharger submitted a technical report on 7 August 2001 that included improvements to the reporting procedures and corrective actions that have been or will be taken to prevent similar violations in the future.

Recent Violations

Between May 2001 and September 2003 there have been additional violations of the Effluent and Receiving Water Limitations and reporting requirements of Order 97-113.

A. Violations of Receiving Water Limitations

1. 34 Ammonia violations (including one violation that occurred in July 2003, after recent plant improvements were completed);
2. 1 pH violation; and
3. 1 Turbidity violation;

B. Violations of Effluent Limitations

1. 1 Chlorine Residual violation;
2. 1 Total Coliform Organisms violation; and

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3. 1 pH violation;

C. Failures to Report

1. 26 failures to report effluent BOD;
2. 8 failures to report effluent Total Coliform Organisms;
3. 2 failures to report effluent TSS; and
4. Failure to report detected chronic toxicity effects in both 2001 and 2002.

Enforcement Summary

The Regional Board issued Administrative Civil Liability Order No. 96-086 (ACLO) and Cease and Desist Order No. 96-087 (CDO) in 1996 for violations of previous Waste Discharge Requirements Order No. 92-116. The Discharger was required to pay \$25,000 immediately and an additional \$25,000 should the Discharger fail to comply with the CDO. The Discharger paid the initial \$25,000 and made improvements to the collection system and treatment facilities. However, the new facilities failed to comply completely with the CDO and permit limitations and prohibitions. The Discharger paid the second \$25,000 on 4 February 2000 and is currently in the process of constructing additional plant improvements. However, the Discharger has not yet complied with the requirements of the CDO issued in 1996.

Due to continued violations of effluent and receiving water limitations and discharge prohibitions in the existing permit (WDRs Order No. 97-113), the Discharger has been issued the following additional enforcement orders:

- A. A Notice of Violation (NOV) was issued on 13 September 2000 for discharging foam to the receiving water, and for violations of effluent limitations for turbidity, total coliform, BOD, and TSS, and receiving water limitations for fecal coliform, turbidity, and ammonia, and reporting requirements. (Between January and June 2000, there were 25 total effluent limitation violations and 12 ammonia violations.).
- B. An Administrative Civil Liability Complaint (ACLC) for \$12,000 was issued on 16 April 2001 for violations of effluent limitations and reporting requirements under California Water Code Section 13385. The violations requiring mandatory minimum penalties included violations of the Effluent Limitations for Total Coliform Organisms, Settleable Solids, Methylene Blue Activated Substances (MBAS), Turbidity, Total Suspended Solids, pH, and Chlorine Residual between the months of January and October 2000.

The Discharger disputed the Regional Board's assessment that several of the violations required mandatory penalties. Regional Board staff provided additional explanation that the mandatory penalties described in the ACLC do apply. After additional delays due to the next meeting of the Placer County Board of Supervisors, the Discharger paid the \$12,000; 73 days after the date specified in the ACLC.

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- C. An NOV was issued on 12 July 2001, for the period August 2000 through April 2001. The violations listed were for performing acute toxicity bioassays without the required certification, for failure to keep a log of receiving water conditions, report detection levels for all chlorine analyses, and monitor BOD on three occasions, for receiving water ammonia violations on 16 occasions, a pH violation, and an acute toxicity violation, and for an exceedance of the daily maximum chlorine limitation.

Due to continued violations of Effluent and Receiving Water Limitations in Order No. 97-113 and threatened violations of the proposed Order, rescission of existing Cease and Desist Order No. 96-087 and adoption of a new Cease and Desist Order with updated compliance schedules, are proposed.